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THE THREE SOUTHERN CONTINENTS

BY

F. D. HERBERTSON, B.A. (LOND.)

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PREFACE

THIS is the last of the continental volumes of the *Elementary Geographies*. The three southern continents have been treated together, and the writer has tried to bring out and explain the broad resemblances and differences between them. The method of comparison adds much to the interest of geography, but it is justified also on other grounds. The power to see resemblances between those things which are alike and differences between those things which are different is the basis both of right thought and right action.

More harm than good is done by vague comparisons without evidence to support them. Any useful comparison of the southern continents must recognize the importance of latitude as a factor. Latitude and its meaning are therefore briefly explained in the opening chapters. The writer has also tried to show the close connexion between climate and plant life. This is specially important in the tropics, where plants must adapt themselves to alternate wet and dry seasons. Plant geography is largely applied climate, and will interest many children who find statistics of climate and rainfall dull and difficult to remember.

In finishing any book a host of obligations rise to the mind, but in this case they are too many to be acknowledged individually. In particular I have to thank Mrs. Collier; Sir Frederick Treves, Bart.; Dr. J. Scott Keltie, Mr. C. Reginald Enock, the Agents-General for the Australian States; the Royal Colonial Institute; Professors Brunhes, Chaix, and de Martonne (for permission to use the desert photograph on p. 51 from the international *Atlas photographique des formes du relief terrestre*, Geneva, Boissonas et Cie); and the Royal Mail Steam Packet Company (R.M.S.P.) for the use of copyright photographs. Other obligations are acknowledged in the proper place.

Oxford, 1912.

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ILLUSTRATIONS

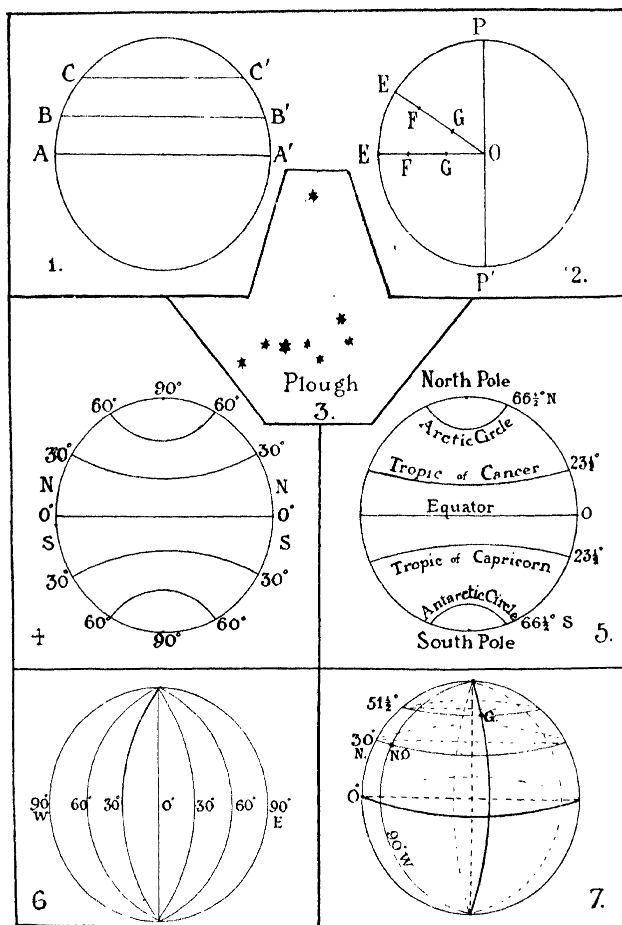
CHAPTER I

PARALLELS OF LATITUDE

1. Position on the Earth. The life of man differs according to the position of his home on the Earth. This affects the heat, the cold, the rain, the plants, the animals, and the kind of work which he does. Position has such important consequences that we must have some method for describing it exactly.

2. The Horizon. The Earth is a moving ball, and the schoolroom globe is a model of it. From the top of a hill we see a line which seems to separate earth and sky. This line is called the horizon. From the deck of a ship we see the sea stretching away till it seems to meet the sky on every side. The horizon appears as a circle with the ship as its centre. We do not often see a perfectly circular horizon on land, except from the top of a high hill or tower in the middle of a plain, for houses and trees interrupt our view. The higher we climb the wider is our view and the more nearly circular the horizon. If we climbed high enough we should see the Earth curving away on every side beneath us as a great ball.

3. The Curvature of the Earth. The curvature of the Earth is so small compared with its size that we never notice it. The highest mountains and the deepest seas affect the shape of the Earth as little as the pits on the skin of an orange affect the shape of the orange. Yet though we do not notice that the Earth is curved its curvature has important consequences.



Figs. 1–7.

1, 2. Rates of Rotation on and within the Earth. 3. The Plough and Pole Star. 4. Parallels of latitude drawn for every 30°. 5. The Polar Circles, Tropics, Equator, and Poles. 6. Meridians of longitude drawn for every 30°. 7. The position of Greenwich and New Orleans determined by latitude and longitude.

zenith of the dome of the sky, 90° from every point on the horizon. People living between the equator and the North Pole see it somewhere between the horizon and the zenith, according to their distance from the equator. They could calculate this distance from the height of the Pole Star, and could show it on a globe by a circle parallel to the equator. Such circles are called parallels of latitude. The equator, where the pole is seen on the horizon, is lat. 0°; and the North Pole, where it is seen in the zenith, is lat. 90° N. The letter N., written after the latitude, shows that the distance is measured north of the Equator. Places where the Pole Star is seen 1° above the northern horizon are in lat. 1° N., and are marked on that parallel on the globe. Places which see the Pole Star 5°, 10°, 20°, 40°, 60°, 80° above the horizon, are marked on the parallels of 5°, 10°, 20°, 40°, 60°, and 80° N. lat. respectively. In London the Pole Star is between 51° and 52° above the northern horizon, much nearer to the zenith than to the horizon (Fig. 7). A degree is divided into 60 equal parts or minutes, written 60′, and each minute into 60 seconds, written 60″. The parallels of latitude are drawn for every 30° in Fig. 4.

11. Places in the southern hemisphere measure their distance south of the equator, and write S. after their latitude. The latitude of the South Pole is 90° S.

12. We might draw as many parallels of latitude as we like on a very large globe. On school globes they are generally shown for every 5°, or 10°, or 15°, according to the size. As the number given to the parallels increases from the equator to the poles, the latitudes near the equator are often spoken of as low latitudes, while those near the poles are called high latitudes. You see from the globe that all parallels of latitude have not the same circumference. If you measure with a string you will

find that the equator has a greater circumference than any other parallel, and that parallels numbered with any given number have the same circumference whether they are measured north or south of the equator.

13. Latitude and the Position of the Sun. So far we have spoken of latitude only in connexion with the position of the Pole Star. A much more important fact is that on the same parallel of latitude the Sun is seen at the same height at noon on the same day, though this height varies at different times of the year. The latitude of a place can therefore be found from the height of the Sun at noon. This is not so simple as to calculate it from the position of the Pole Star, because the time of year must be taken into account. The fact that the Sun rises to different heights at noon in different latitudes at different times of the year, causes those differences of climate which affect man's life in so many ways.

Exercises

1. Point out some facts which suggest that the Earth is not flat but shaped like a ball. Have you noticed any of these yourselves?

2. Give the latitude of the town or village in which you live.

3. On the globe find the latitude of St. Petersburg, London, Paris, Rome, Cairo, Montreal, New York, San Francisco, Quito, Sydney, Cape Town, Rio de Janeiro, North Cape, and Cape Horn.

4. Can we fix the position of a place on the globe when we know its latitude? Give reasons for your answer.

5. How does difference of latitude affect the life of man on the earth? Explain your answer by anything you have read in books of travel, mentioning the names of these.

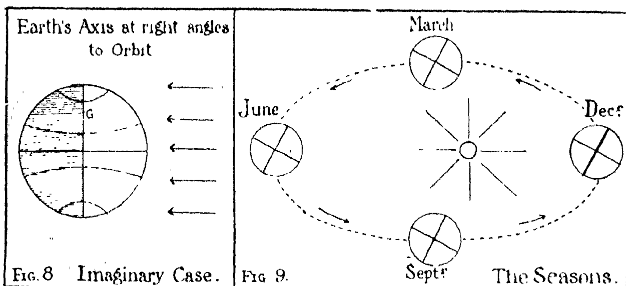
CHAPTER II

LONGITUDE AND TIME

14. The Rotating Earth. Think of an orange lying on a table with two pins in it. How could we describe their position so that another person could stick two pins in another orange in the same way. It would be difficult, because there are no fixed lines on the oranges to measure from. If the Earth were at rest we should have the same difficulty, and we could neither describe the position of places on its surface, nor show them on the globe.

15. The Earth spins round, or rotates, once in twenty-four hours. The Sun comes into sight, or rises, in the east, and so we know that the Earth rotates from west to east. Not only is the Earth rotating as a whole, but every point on its surface and every point within it is rotating too, but at different rates. Fig. 1 shows three parallels of latitude, AA′, BB′, CC′. AA′ is greater than BB′, and the point A makes a longer daily journey than the point B, and must rotate faster. Similarly, point B makes a longer journey than point C, and rotates faster than B. The farther any point on the Earth's surface is from the equator, the shorter is its daily journey, and the slower its rotation. At the poles there is no rotation at all. At the equator every point rotates through a distance of 25,000 miles a day, or more than 1,000 miles an hour. London, with all its streets and people, is rotating at over 600 miles an hour. We do not feel this movement because we too are moving with the moving Earth.

16. Now look at Fig. 2. The line PP′ joins the two poles, which are not rotating at all, and passes through



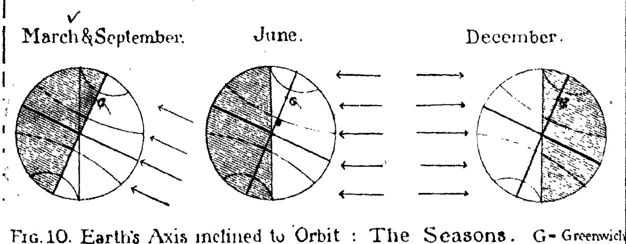


Fig. 10. Earth's Axis inclined to Orbit : The Seasons. G - Greenwich

Fig. 8. The Seasons as they would be if the Earth's axis was at right angles to its orbit. Figs. 9, 10. The position of the Earth at the different seasons with axis inclined.

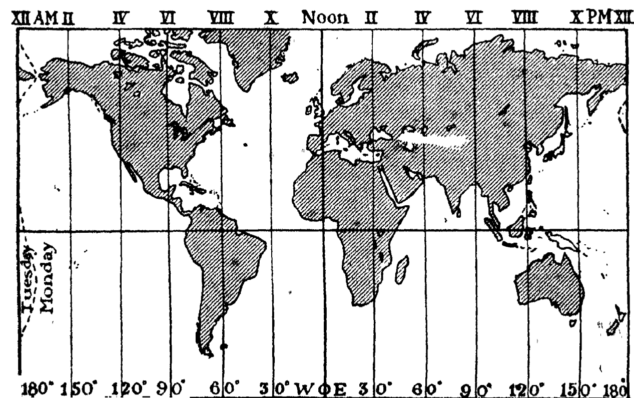


Fig 11 Time Divisions --- Date Line where not 180°

In a few cases for political reasons the date line diverges slightly from the meridian. These are shown by a dotted line. Note that in this map the Earth's surface is not shown as curved, with curved meridians, but as an unrolled cylinder, with the meridians as straight lines. The value of a degree of longitude is greatly exaggerated towards the poles.

O, which represents the centre of the Earth. Every point in PP′, the line which passes through the poles and the Earth's centre, is at rest. This line of no rotation is called the Earth's axis. In Fig. 2, E is a point on the surface of the Earth, and F and G are points within the Earth, and E is farther from O, the Earth's centre, than B. As the Earth rotates E, on the surface, traces out the circumference of a greater circle than F, a point within the Earth, and F traces out a greater circumference than G. All three take twenty-four hours to one rotation, and therefore E moves faster than F, and F faster than G. O, the Earth's centre, is on the axis, or line of no rotation. Study Figs. 1 and 2 carefully till you are sure you understand them.

17. These definitions of pole, equator, and axis refer to the Earth itself, and not merely to the globe. The poles are the two points, and the only two points on the Earth's surface, which are at rest. The equator is the line midway between them where rotation is most rapid. The axis is the line of no rotation, which passes through the poles and the centre of the Earth.

18. Longitude. Many places besides London are 51° 30′ N. of the equator. Before we can describe the exact position of a place we must know, not merely which parallel of latitude it is on, but also its position on that parallel east or west of a given point. This gives us its longitude.

19. Longitude, like latitude, is fixed by astronomical observations. Each point on the rotating Earth has one moment in its day, called noon, when the Sun is highest in heaven. All places on the Earth's surface which are situated on the line joining that place to the two poles have noon at the same second, though the actual height of the Sun above the horizon will vary in different latitudes.

Such a line, joining a given place on the Earth's surface to the two poles, is called a meridian, or line of simultaneous noon. Some meridian must be taken as the starting-place, and the longitude of all other places must be measured by their distance east or west of it. Scientific men have agreed to take the meridian line passing through Greenwich Observatory, near London.

20. The Prime Meridian. The meridian of Greenwich is called the zero or prime meridian, and is numbered 0°. The latitude of Greenwich is 51° 27′ N., and the position of Greenwich on the Earth's surface is lat. 51° 27′ N., long. 0°. A point on the equator which has its noon at the same second as Greenwich is in lat. 0°, long. 0°. Fig. 7 shows the position of this point and also that of Greenwich. There are 360 meridians of longitude, each divided into minutes and seconds, and of these 180 are reckoned east from Greenwich and 180 west. The 180th meridian east of Greenwich is also the 180th meridian west of Greenwich, as the globe shows. Fig. 11 shows the hour for other parts of the world when it is noon at Greenwich.

21. When we know the latitude or distance of a place north or south of the equator, and also its longitude or distance east or west of the meridian of Greenwich, we know its exact position on the Earth and can show it on the globe. It is the point where a given parallel of latitude cuts a given meridian of longitude. In Fig. 6 the meridians are drawn for every 30 east and west of Greenwich. In Fig. 7, G. stands for Greenwich and N.O. for New Orleans, which is in lat. 30° N., long. 90° W. The two dotted lines represent the Earth's axis and the meridian of 180°.

22. Longitude and Time. The Earth rotates through 360° in twenty-four hours, or through 15° in one

hour, or through 1° in four minutes. Canterbury, in long. 1° E., has its noon, or high Sun, four minutes earlier than Greenwich ; and Oxford, in long. 1° W., has its noon, or high Sun, four minutes later than Greenwich. Both Canterbury and Oxford use Sun time for the cathedral services, which begin in Canterbury nearly ten minutes sooner than in Oxford. For all other purposes both use Greenwich time, though this is a little later than the actual Sun time at Canterbury and a little earlier than the actual Sun time at Oxford.

23. When it is noon at Greenwich it is 6 p.m. by local time on the meridian of 90° E., which passes near Calcutta, and 6 a.m. on that of 90° W., which passes near New Orleans. On the meridian of 180° it is midnight. Is it midnight to-day or to-morrow? Such questions can only be settled by international agreement. It is the rule for ships going east to count two days of the same name as they cross long. 180°, which passes near Fiji, and for ships going west to drop a day. Similar rules are made for changing the hour as we travel east or west.

24. Greenwich time is used in France, but when travellers reach the German frontier they put their watches forward one hour, to the time of 15° E. Coming home they put them back an hour to Greenwich time. Greenwich time is not used in Ireland, and a traveller from London finds his watch is nearly half an hour fast when he reaches Dublin.

25. Globes and Maps. Position can be shown more accurately on curved globes than on flat maps, but maps are easier to carry about. All maps are slightly misleading, but there are various ways of drawing the lines of latitude and longitude on a map so as to make the error as small as possible. The value of a degree of

latitude never varies, but the value of a degree of longitude diminishes from the equator to the poles. Look at the globe, and satisfy yourselves about this. At the equator a degree of longitude measures about 69 miles, in London it is about 45 miles, and at the poles all meridians meet. The least correct maps are those drawn on Mercator's projection, for these give a degree of longitude the same value in all latitudes. In other words, they exaggerate the area of sea and land in high latitudes.

Exercises

1. State clearly what you understand by the terms pole, equator, parallel of latitude, meridian of longitude.

2. Give the longitude of the town or village you live in. Do the town clocks use Greenwich time or not? If so, is your real or Sun time fast or slow by Greenwich time? Do you know how much? How would you find out?

3. On the globe find the longitude of Alexandria, Delhi, Singapore, Shanghai, Adelaide, Sierra Leone, Rio de Janeiro, New York, and Chicago. State as nearly as you can what the time would be at each when it is noon at Greenwich.

4. In going to Switzerland we put our watches on, and in coming home we put them back. Why?

5. What should we do to our watches in going to Dublin from London, and in coming back? Why?

6. Which affects man's life on the Earth most, position in latitude or position in longitude? Give full reasons for your answer.

CHAPTER III

THE SEASONS IN TROPICAL LANDS

26. The climate and products of the southern continents differ from those of Europe and Asia. This is due partly to the different arrangement of sea and land and of high and low land in the southern hemisphere, but more to the latitude of the southern continents. How, then, does latitude, or distance from the equator, affect climate?

27. The Earth's Path round the Sun. In this country we know (i) that some months are warm and others cold; (ii) that cold months have short days and warm months have long days; and (iii) that the Sun rises higher in the sky in summer than in winter. These differences are due to the way in which the earth revolves round the Sun.

28. The Earth rotates on its axis and revolves round the Sun at the same time, as dancers waltz round a room. This comparison is not altogether good, for the dancers are in an upright position at right angles to the floor, while the axis of the Earth is not at right angles to its orbit or path round the Sun. If the Earth's axis were upright the Sun's rays would always fall on the Earth at right angles to the equator, as in Fig. 8; the days and nights would always be equal in length; the Sun would always be at the same height at any given place all through the year; and there would be no differences of season. Astronomers have discovered that the Earth's axis is inclined in such a way that from March 21 to September 23 the northern hemisphere is tilted towards the Sun and away from the Sun for the other six months. Similarly, the southern hemisphere

is tilted away from the Sun from March to September and towards it for the rest of the year. (Figs. 9 and 10.)

29. When the northern hemisphere is tilted towards the Sun it receives more light and heat than the southern hemisphere and has longer and hotter days. It has its summer while the southern hemisphere, which is tilted away from the Sun, has its winter. From September to March, the southern hemisphere has its summer and the northern hemisphere its winter.

30. The Equinoxes. The Sun is highest overhead in this country on June 21, the longest day of the northern hemisphere. The Sun is never vertically overhead in this country, but it is more nearly so then than on any other day in the year. In some latitudes the Sun is overhead at least once a year. At the equator it is vertically overhead twice, on March 21 and on September 23. On both these days the Sun's rays reach both poles and day and night are equal in length all over the world. These are called the equinoxes, or periods of equal night.

31. The Tropics. After March 21 the Sun is seen higher every noon in the northern hemisphere, but in the southern hemisphere people see it lower in the sky every noon. On June 21 people living on lat. 23° 30′ N. see the Sun vertically overhead. Its rays then reach 23° 30′ farther from the equator than on March 21, and at places within 23° 30′ of the North Pole it does not sink below the horizon. The parallel of 23° 30′ N. lat. is called the Tropic of Cancer. Tropic means a turning point, and as the Sun rises less high after June 21, men spoke as if it actually turned south. The parallel of 66° 30′ N. (90°–23° 30′), within which the Sun does not set at midsummer, is called the North Polar Circle.

32. After June 21 the Sun rises less high daily in the northern hemisphere, and higher in the southern. It is vertical over the equator at the September equinox, and vertical at lat. 23° 30′ S. on December 21, the shortest day of the northern and the longest day of the southern hemisphere. This parallel is called the Tropic of Capricorn. When the Sun is vertical at the southern tropic it does not set within the South Polar Circle, lat. 66° 30′ S. After December 21 the Sun appears to turn north again, the southern day shortens, the Sun rises less high in the southern and higher in the northern hemisphere, and we look forward again to spring and summer. In Fig. 5 the equator, the tropics, and the polar circles are marked.

33. Differences in the Seasons. Evidently, the seasons differ greatly in different latitudes. At the poles the Sun is above the horizon for six months in the summer of that hemisphere, and is invisible during the winter six months. Within the polar circles there are only two seasons, a cold winter with little or no daylight, and a cool summer with little or no darkness. Between the polar circles and the tropics are the temperate lands, with cold winters and short winter days, and warm summers and long summer days. Night and day differ most in length near the poles and least near the tropics. Within the tropics night and day are always nearly equal in length, and there is no cold season at sea-level. Seasons are distinguished by difference in rainfall and not by any marked difference in heat. At the equator day and night are always equal, and the heat at sea-level differs little throughout the year.

34. Rain and Winds. We know that the air contains water vapour, though we cannot see it. If we spill water on a cloth on a hot day the cloth soon dries,

for the water evaporates. It is changed into water vapour, and is taken up by the air. The same thing happens more slowly on a cold day. All over the Earth the surface layers of water are evaporating and passing into the air as water vapour, quickly where the air is warm, and slowly where it is cold. Warm dry air not only takes up water vapour more quickly, but it takes up and holds more than cold air. When air, whether hot or cold, has taken up all the water vapour it can hold it is saturated. If saturated air is cooled some of its water vapour is condensed and falls as rain.

35. We know that the Sun's rays heat land and water at different rates. On a hot day a garden path feels hot and a pool of water cool to our bare feet. Land is more quickly heated than water, but it does not keep its heat so long. Water is heated more slowly, but holds its heat longer. These simple facts have much to do with climate. In summer the land and the air over the land are hotter in the same latitudes than the sea and the air over the sea. The air over the hot land expands, becomes lighter and rises. This sets up a movement of the whole atmosphere and causes winds. As the hotter air rises, cooler and heavier air is drawn in below at the surface of the Earth to take its place, and we feel this inflowing air as a wind. The cool sea-breezes at the seaside in summer are caused in this way. In the hottest part of the day the heated air over the land is rising and cooler air is drawn in from over the cooler sea as a sea-breeze.

36. The wind system of the Earth cannot be explained here, but we can name the prevailing winds in different latitudes. When air ascends or descends vertically a belt of calms is formed. There is a belt of calms at the equator, where the heated air is always rising. Sailors

call these the 'doldrums'. Another belt of calms occurs about lat. 30° in the 'horse latitudes'.

37. Between these two belts of calms is the region of the trade winds. These are regular winds, caused by cooler air flowing from the poles towards the equator to take the place of the hot ascending air. The trade winds do not blow due north and due south from the poles to the Equator, but are affected by the rotation of the Earth. They are felt as north-east winds in the northern hemisphere and as south-east winds in the southern hemisphere. They are of great importance to sailing vessels, because they blow all the year round and not merely at certain seasons. They are felt farthest north in the northern summer, when the belt of greatest heat follows the Sun northwards, and farthest south in the southern summer.

38. On the polar side of the horse-latitude belt of calms westerly winds blow for most of the year. Our own country is in this belt of westerly winds. These are stormy and variable, particularly in winter and near the equinoxes. They blow more strongly in the southern hemisphere than in the northern, especially in the latitudes called the 'roaring forties.'

39. Wet and Dry Seasons. Near the equator the air is rising into cooler layers of the atmosphere where it cannot hold so much moisture. The surplus falls as rain, and the equatorial belt has rain at all seasons, but most at the equinoxes, when the Sun is vertical over the equator. Summer, when the heated air tends to rise, is the wettest part of the year in most parts of the world. In tropical lands it is the only wet season. The tropical lands have two seasons, a hot wet summer, called the wet season, and a hot dry winter, called the dry season. Near the equator there are two very wet

seasons at the equinoxes, and two rather drier ones when the Sun is vertical at the tropics. As the northern summer is the southern winter, the wet season of the northern hemisphere corresponds with the dry season of the summer hemisphere.

40. The trade winds bring little rain at any season, for they are blowing from colder to warmer latitudes, and are taking up moisture. The rain which they bring falls on the eastern side of the continents which they reach first, or else on high mountains which turn them upwards into colder layers of the atmosphere. There are dry deserts in all the southern continents in the trade-wind belt.

41. The westerly winds bring rain at all seasons, especially to the western coasts of the continents which they strike first. They blow in temperate lands, where the seasons are marked by differences in the amount of light and heat received rather than by difference of rainfall.

42. Monsoons. Monsoons are seasonal winds, which blow only at certain times of the year. They are due to the arrangement of sea and land. Eastern and South-eastern Asia, where they blow most strongly, are in the trade-wind belt in winter, and have little rain. As the Sun moves north in summer the great land masses become intensely heated, and the air above them rises. Air is drawn in from over the cooler sea, forming strong, stormy, wet winds, which are sea-breezes on a gigantic scale. Their direction is affected by the shape of the lands, but they always bring rain and blow in late summer. In India they blow as the south-west monsoon, in Eastern Asia as the south-east monsoon, and in Australia as a northerly monsoon. The word monsoon means a seasonal wind.

Exercises

1. How are the seasons caused? Do all parts of the Earth have the same kind of seasons?

2. Why is Christmas Day generally cold in England and hot in South Africa?

3. Explain what you understand by the terms tropic, equinox, trade winds, monsoons, 'roaring forties'.

4. What are the prevailing winds in our own islands? What effect has this on our climate?

5. Name some lands which lie in the track of the 'roaring forties'. Which will be their wettest coast?

6. Name some lands which lie in the track of the trade winds. Which parts of them will receive least rain?

CHAPTER IV

THE FORESTS OF THE WORLD

43. Grass and Trees. Grass and trees have different advantages and disadvantages in the race for life. Trees need years to become full-grown and produce seeds, while grass ripens in a few weeks. Grass needs less moisture than trees, but has shorter roots, and must find water within a smaller area. Trees, though they need abundant moisture, have long roots, and can draw it from a large area. Sometimes trees are best suited to the soil and climate of a region, and sometimes grass does better. Some parts of the world are too cold or dry for either.

44. On a rich well-watered soil plants grow closely and are tall, partly because the soil supplies enough nourishment for quick growth, and partly because every

plant tries to overtop its neighbours and get more light and air. On poorer or drier soils they grow far apart and are stunted.

45. Seasonal Changes in Plants. In our own country plants have to live through a long cold winter. During this season they show few signs of life above ground but their root life goes on. Most of our trees shed their leaves in autumn. Our evergreen trees have leaves specially fitted to bear the cold. Firs and yews have small needle-shaped leaves, while holly has broad, thick, fleshy leaves, with a hard shiny surface to protect the tender fibres below. Firs and yews expose as little leaf surface as possible, while holly makes the exposed surface strong and resistant. Bulbs resist the cold of winter by storing up nourishment in their swollen roots, which protect the growing parts. All these are familiar examples of devices to enable plants to live through a cold winter.

46. Tropical Plants. Within the tropics the seasons differ little in heat but much in rainfall. Tropical plants must be able to live through a long dry season, when the soil contains little moisture, and evaporation from the surface of the leaves goes on very fast in the hot air. Some tropical plants have long creeping roots, which pierce down to lower wetter layers of soil. Some have fleshy bulbous roots. Others store water in their trunks and branches, which are often protected by thick bark, and by secretions of gum, resin, or oil. The leaves are protected against evaporation in various ways. Some fall in winter, and those which do not are either much divided and often small and feathery, or else they are strong, varnished, and fleshy. A few trees turn their leaves edgeways during the hottest part of the day.

47. The Selvas, or Equatorial Forest. Rain falls all the year near the equator, but most heavily at the

equinoxes. The sunlight is intensely strong, and the heat is always great at places less than 3,000 feet high. The hot wet climate is like that of a greenhouse in which palms and orchids are grown. Find the Amazon in South America, and the Congo in Africa, both in the equatorial belt. The basins of these rivers are covered with dense, hot, wet rain-forests, or selvas. Our own woods contain very few different kinds of trees, but the selvas contain an infinite variety of species. The trees are tall and huge in girth, and the forests are really two stories high. A hundred feet or two above the ground are the great outspread branches, overgrown by a network of creepers, which have climbed up the tall trunks to spread out their gorgeous blossoms in the blazing sunlight. Plants grow on plants, rooting on each other's branches, and struggling up towards the sunshine. Brilliant birds and butterflies flit through this upper forest world, which is the home of apes and tree snakes. The lower forest is hot, moist, marshy, and dark, for the thick roof of leaves and branches shuts out both light and air. The air is heavy with the smell of rotting plants, which make the soil deep and rich. The heavy rains feed innumerable streams, which flood the low-lying parts of the forest. In the drier months the streams are the only easy roads through the dense jungle.

48. Such a forest is not a suitable home for either men or animals. Men find little game to hunt, but they fish in the rivers and gather eatable and other plants. Rubber is now one of the most useful of these. It is difficult to clear the selvas, for work is exhausting in the hot close depths of the forest, and clearings and roads are overgrown almost as fast as they are made The wandering forest tribes seldom cultivate the same patch for two successive years, but the white settler

clears more thoroughly and weeds his crops of banana, cacao, sugar, spices, and rubber.

49. Mangrove Swamps. The coastal swamps are flooded by the sea at every tide, and the mangrove is the only tree which grows well in them. A mangrove swamp is not a beautiful sight at low tide, for the misshapen stilt-like roots stand high out of the foul mud, on which crabs and reptiles crawl, while oysters cling to the mangrove roots. Deadly fevers are caught in these swamps, yet we cannot but admire the devices by which the mangrove protects itself. Its long unsightly roots give it a firm hold in the mud, and lift the branches and leaves far above the salt water at high tide. Its fleshy, glossy, leathery leaves lose little moisture under the hottest sun, and its soft trunks and branches store water.

50. Tropical Forests. These have a heavy rainfall in the wet season, and a marked dry season. The trees are less closely set and less tall than in the selvas, and there are fewer species. Most of the trees shed their leaves in the dry season, but both leaves and flowers reappear as if by magic after the first rain. Growth and decay are not so rapid as in the selvas, and the forests are healthier and easier to clear. Among their useful plants are the oil palm, banana, maize, millet, coffee, and many others. The flatter parts are irrigated in the dry season by canals cut from the rivers.

51. Trade-Wind Forests. These are found on the east coast of the continents in the trade-wind belt, between lat. 30° and lat. 40°. Here the summers are hot, the winters mild, and the wet and dry seasons much less marked. In the southern hemisphere subtropical forests cover the better soils of Southern Brazil and the east coasts of South Africa, Australia, and New Zealand. In Africa, where there is hardly any land within these



Fig. 12. Forest of Coco-nut Palms.



latitudes, they are also found on the slopes of the higher mountains near the equator, a few thousand feet above the sea. The commonest plants are small palms and bamboos and tree ferns, all with much-divided leaves. Laurels, camphor trees, magnolias, and other species have fleshy evergreen leaves. These subtropical forests yield many fine timber trees. Quinine or cinchona is a valuable medicine, and rubber, rice, sugar, and cotton are cultivated in the clearings. Such forests once covered much of Eastern Asia and the South-east United States. Agriculture is beginning in the cleared subtropical forest-regions of the southern hemisphere.

52. Mediterranean Forests. The lands on both sides of the Mediterranean receive winter rains from the westerly storm winds, which blow farthest towards the equator in winter. In summer they are on the edge of the trade-wind belt, and are dry. The forests which once covered the wetter parts have been cut down and only patches remain. The trees are all fitted to live through a hot dry summer. Most of them are evergreen, and some, e.g. the cork oak, have a thick bark. The small-leaved evergreen olive is a typical tree. It grows wild, but improves when cultivated. Bulbs do well, and the iris, anemone, narcissus, asphodel, and many others grow wild. The hill slopes are terraced and planted with olives, vines, oranges, lemons, almonds, and many other fruits, while rice, cotton, and maize are grown in the hotter wetter parts. Old clearings are soon covered with a dense scrub of dry strong-smelling shrubs and bushes if they are allowed to go out of cultivation. The Mediterranean forests of the southern continents are being cleared and the Mediterranean plants of the northern continent are being introduced.



Photograph by Underwood & Underwood.

Fig. 14. FIELD OF PINEAPPLE.



Photograph by Valentine & Sons.

Fig. 15. FIELD OF SUGAR CANE

53. Temperate Forests. Our own woods contain oaks, elms, beeches, and other temperate trees, most of which lose their leaves in winter. Nearer the pole firs and birches are the chief forest trees. There are vast temperate forests in the northern hemisphere, and immense areas have been cleared. (Vol. IV.) Cool temperate forests cover the southern part of South America, and the higher slopes of the higher mountains between the tropics.

54. Forest Belts. These different forests do not succeed each other without a break. The selvas pass into the tropical forests, but beyond these are lands which are too dry for forests except on the east coasts of the continents. (In this trade-wind region there is a belt of grasslands and deserts.) Beyond these, on the side away from the equator, are the Mediterranean forests. Beyond these there are dry areas in the centre of the continents, and another belt of grasslands is found here between the Mediterranean and temperate forests. On the far side of the temperate forests, in high cold latitudes, neither trees nor grass can grow.

Exercises

1. Explain clearly the advantage trees have when (*a*) they shed their leaves in winter, (*b*) when they are evergreen.

2. Describe the equatorial rain forest, and explain why it is thinly peopled.

3. How does a dry season affect the plants of a region?

4. Why have the Mediterranean lands dry summers and wet winters? How does this affect their plants?

5. Has Britain wet or dry summers and winters? How does this affect our plants?

6. The belts of forest and grassland are not everywhere of the same breadth. What causes might make them irregular?

CHAPTER V

THE GRASSLANDS OF THE WORLD

55. Tropical Grasslands, or Savanas. These are found on both sides of the hot wet forests. The Spanish conquerors of South America called them savanas, and also campos and llaños. Savanas are hot, for they lie between the tropics, and they have a long dry season. In the wet season they receive much less rain than the equatorial belt, or the east coasts of the continents in the trade-wind belt. The savanas are grasslands thinly dotted with trees, which make the landscape look like a park. Trees are not found on the higher ridges, but may form woods in damper hollows and valleys. As the trees are thinly scattered, each has room to branch freely and many are nobly shaped. The largest is the baobab, which is a water-storing tree. All the savana trees, except the palms, shed their leaves in the dry season.

56. The grasses of the savana are not like those of our own meadows: they are often taller than a man, and many bear feathery heads like the pampas grass. The kind known as elephant grass is very difficult to penetrate, and makes cover for elephants and other game. The savana grasses grow in tufts, and some have water-storing roots. They are dull and dry in colour, and fade to coarse straw in the dry season. This straw protects the roots from the heat and dryness, as moss protects flowers on a flower-pot.

57. Fires are common in the savanas in the dry season. The grass is often burnt off by man, to get a fresh young growth after the rain, or to clear the ground for tilling. These fires help to keep down trees.

58. The animals of the savana are specially fitted to their home. Some, like the elephant and rhinoceros, are huge beasts, strong enough to push their way through the stoutest grass. The hippopotamus can force its way through the dense reeds of the rivers and swamps. Others, like the antelopes and the great cats, are very nimble, and can leap high over obstructions. The giraffe, with his long neck, can reach the branches of trees, which are his food. All the savana animals are coloured to match the yellowish grass and soil.

59. The savanas, like all grasslands, are suited for the home of man. It is true that the more dangerous animals must first be killed, but this supplies him with meat, skins, and ivory, for food and trade. The wild animals are replaced by domesticated animals, and cattle-keeping is important in all the savanas. Agriculture is easy in the wet season, but often requires irrigation in the dry season.

60. Tropical Scrubs. On the east coast of the continents the savana passes into subtropical forest, but in the dry interior trees disappear, and grass is replaced by dry thorny plants, or by fleshy water-storing plants, like the prickly cactus. These regions, where trees and grass are rare and there is more bare soil than plant covering, are called scrub lands. The bare ground is heated in the day and cooled at night, and there is more difference between day and night than between season and season. There is much scrub land in South America and Africa and Australia.

61. Deserts. Parts of the trade-wind lands are too dry even for scrub plants. These form the deserts of the world, which are largest where the continents are broadest and the distance from the sea greatest. The deserts of the northern hemisphere are larger than those of the



southern hemisphere. The largest is in Northern Africa, and is part of a northern belt of desert, which is continued across Asia (vol. vi) and across the western part of North America. (The desert of Australia, the largest in the southern hemisphere, is part of a southern belt of deserts which crosses South-west Africa and the west coast of South America.)

62. The deserts are rainless, though showers may fall once in a few years. Sea mists form on the coastal deserts of South America and South Africa. The surface may be flat, or hilly, and of sand, or stones, or rock, or salt. The sandy deserts would be fertile if they had rain, and hidden seeds often start into life after a shower. Such plants as there are grow far apart, and are either thorny or coarse dust-coloured tufts of grass. The roots go down to great depths in search of water, as was shown when the Suez Canal was cut across the desert.

63. Oases. Deep dry valleys are found in some parts of the desert, but these are empty, except after a storm. Such intermittent torrents cannot be used for irrigation, which would make the desert fertile. In some parts of the North African and Australian desert there are stores of underground water, caused probably by rain which has fallen in wetter regions, and made its way underground. This may gush out as springs, and in some parts it can be reached by deep wells. If water can be brought to the surface the desert changes into a fertile oasis. This may be a mere clump of date palms by a well, or a large irrigated belt containing many villages. Rice, cotton, olives, vines, sugar-cane, maize, millet, tobacco, oranges and many fruits are grown in the larger oases.

64. The desert outside the oasis forms a barrier between the fertile lands on either side. It can be



Photograph by Underwood & Underwood.

Fig. 17. CACTUS ON THE DRY SLOPES OF THE ANDES.

crossed only by a few routes, on which the wells must not be too far apart or travellers and their beasts would die of thirst. The camel has been introduced into the deserts of North Africa and Australia.

65. Temperate Grasslands or Steppes. In the interior of the northern continents a belt of grasslands is found between the Mediterranean region of winter rains and the temperate forests. These temperate grasslands are called steppes. They have hot summers, cold winters, and a small rain in summer. Trees do not easily endure this combination of winter cold and scanty rainfall, and seedlings are choked by the rapid growth of grass and bulbs after the spring thaws. All plants wither under the hot summer sun, and except for a few weeks of beauty the steppe is a desolate landscape (vol. iv). It is the home of cattle-breeding peoples, and most of our domesticated animals were introduced from the steppe lands of the Old World. The steppes of the southern continents are small, owing to the absence of broad land masses in temperate latitudes. Steppes are found in South America in the east between lat. 30° S. and lat. 35° S., and there are poorer steppes in the extreme south. Some steppe land is found in Australia, and in the higher parts of South Africa. Grasslands corresponding to the steppes is found on the higher slopes of high mountains between the tropics.

66. Polar Grasslands. In high latitudes, beyond the northern and southern limits of the temperate forests, neither trees nor grass can grow, except in the most sheltered spots. Mosses and lichens are the only plants, and all are dwarfed. This region is called the tundra (vols. iii, iv). In the southern continents, except in the extreme south of South America, it is only found on the higher slopes of mountains.

Exercises

1. Explain clearly the difference between a steppe and a savana.

2. How do the steppe animals differ from the savana animals? Has this affected human life in any way?

3. Make a map of the world with the deserts coloured brown.

4. Why are oases found in a desert? What kinds of plants are most suited to oases?

5. If you were sleeping in the desert would you require blankets (*a*) underneath your body, and (*b*) above it? Explain why.

6. Which is the most difficult barrier to cross, a high mountain range, or a broad desert? Give your reasons.

CHAPTER VI

THE THREE SOUTHERN CONTINENTS

67. Position of the Three Southern Continents. Study carefully on the globe the position of the three southern continents. The equator crosses Africa, nearly in the middle of the continent. Africa is broadest north of the equator, and most of it is in the northern hemisphere. The equator crosses the Asiatic islands of Sumatra and Borneo, and passes just north of New Guinea. New Guinea, Australia, Tasmania, and most of the Pacific islands are in the southern hemisphere.

68. In the New World the northern tropic crosses Mexico, and passes north of Cuba in the West Indies. Central America, most of the West Indies, and the northern part of South America, lie between the northern tropic and the equator. The southern tropic crosses South America where it begins to taper, and most of

South America is within the tropics. The Tropic of Cancer crosses Africa about half-way between the Mediterranean Sea and the equator, and the Tropic of Capricorn passes through the south of Africa and the extreme south of Madagascar. Most of Africa is, therefore, within the tropics.

69. Australia has less land in tropical latitudes than the other two southern continents. The Tropic of Capricorn crosses the centre of the continent. The extreme south of Australia is, roughly, in lat. 40° S., and this parallel also crosses New Zealand. New York, Madrid, Constantinople and Peking are on or near this parallel of latitude in the northern hemisphere. The most southerly point of New Zealand is about lat. 47° S., in latitudes corresponding to that of Basel and Budapest in Central Europe. Most of France, Germany, Russia, and all Britain and Scandinavia, are farther from the equator than any part of Australia or New Zealand. South Africa is nearer the equator than any part of Europe, and its most southerly point is in the latitude of Crete and Cyprus in the Mediterranean, of Teheran in Persia, of Tokyo in Japan, and of California. Only South America extends into latitudes corresponding with those of Northern Europe. Cape Horn is, roughly, in lat. 56° S., in the latitude of Edinburgh, Copenhagen, Moscow, Kamchatka, and Labrador in Eastern North America in the northern hemisphere.

70. South America has the greatest range of latitude, from that of the equatorial lands to that of Scotland.

71. Land and Water in the Southern Hemisphere. The globe shows that in the northern hemisphere the lands are broad and compact, and that the seas are small. Notice the breadth of Eurasia from east to west. The land mass is continued across the New

World except for the narrow break of Bering Strait. In the southern hemisphere there are great stretches of unbroken ocean. Australia is the only great land mass which is entirely in the southern hemisphere, if we exclude the unknown ice-covered continent which surrounds the South Pole. Both Africa and South America taper rapidly south of the equator, and the Pacific Ocean is broken only by scattered islands. Find on the globe Honolulu, in the Sandwich Islands, almost on the Tropic of Cancer, which is nearly equally distant from the shores of Japan, Australia, New Zealand, and North and South America. The northern hemisphere is the hemisphere of land, and the southern hemisphere is the hemisphere of water.

72. Distribution of High and Low Land in the Southern Continents. Turn to the coloured maps at the beginning and end of this book, and see how the continents differ in height and in the distribution of high and low land. If the three southern continents were reduced to a uniform level above the sea, Africa would rise 2,130 ft. above the sea; South America would stand 1,900 ft. above the sea; Australia, though higher than Europe, would stand only 1,150 ft. above the sea. Do not confuse the proportion of high land with the actual height of individual mountains. Many mountains in South America are higher than any in Africa, although the average or mean elevation of the continent is less.

73. In Eurasia the highest land runs from east to west, as a well-marked though broken chain, which is highest about lat. 40° N. in Europe, and between lat. 35° and 30° N. in Asia. In South America a long high mountain chain follows the west coast from north to south. East of this are vast plains. Most of Africa is

a high tableland, rising from the sea in a series of steps or terraces. This arrangement is very well marked south of the equator, but less so in Northern Africa. The western half of Australia is also a tableland, but a much lower one. The centre of Australia consists of lowlands, cut off from the eastern seas by high ground, which is continued through Tasmania. The mountains of New Zealand run from north to south, and the largest plains are on the east coast of the South Island.

74. Distance from the Sea. The shape of the three southern continents affects the distance of places from the sea. In Africa, the broadest of the three southern continents, the average distance from the sea is nearly 420 miles. In South America, which is about half the size of Africa, the average distance from the sea is 340 miles. In Australia, which is less than half the size of South America, it is not quite 220 miles. These figures show how far the climate is likely to be affected by the sea.

75. The Southern Continents compared. The following table gives a number of figures for comparison. They need not be learned.

	Africa.	Australia.	South America.
Area	11,280,000 sq miles	3,000,000 sq mile	650,000 sq miles
Length of coast . .	19,000 miles	12,000 miles	17,800 sq. miles
Average distance from sea	417 miles	217 miles	342 miles
Average height above the sea . . .	2,130 feet	1,150 feet	1,900 feet

Exercises

1. Compare the latitudes of the three southern continents.

2. On a map of the world colour those parts of the three southern continents which lie within the tropics.

3. Which of the three southern continents has the smallest and which has the greatest range of temperature, taking latitude only into consideration? Give your reasons.

4. Name all the circumstances which affect climate.

5. Draw a diagram to show the relative size in millions of miles of the three southern continents.

6. Which of the southern continents has the longest coastline in proportion to its area? Which has the smallest?

CHAPTER VII

AFRICA

76. Size of Africa. The maps in our atlases are not drawn on the same scale, and are likely to mislead us as to the size of different lands unless we constantly use the globe as well. The map of Europe has a full page, and so has the map of Africa, though Africa is nearly three times as large as Europe. We understand better how large Africa is when we know that the desert of Northern Africa alone is nearly as large as all Europe. Africa is nearly 5,000 miles long from north to south, and almost as broad from east to west (4,600 miles) at its broadest. Notice that it is not cut up into peninsulas and gulfs like Europe and Asia, so that it has a small coastline for its size. Africa has only about 16,000 miles of coast, while Europe, with one-third of its area, has 20,000 miles of coast.

77. Africa and Eurasia. The coloured map shows that the Isthmus of Suez, 80 miles wide, is the only land connexion between Africa and the rest of the Old World. This isthmus forms a barrier between the Mediterranean and Red Seas, and ships from Europe had long to go round the Cape of Good Hope to reach the Indian Ocean.

78. The Suez Canal. The Isthmus of Suez is a desert, and useless as a land route. It is no longer a barrier between two continents, for about fifty years ago the Suez Canal was cut across it. This canal passes through two lakes which fill depressions in the isthmus. Its length is 87 miles, of which 21 miles are lake. It is lighted by powerful electric lights, and can be used by night as well as by day. Ships going to India enter the canal at Port Said, on the Mediterranean Sea, and leave it at Suez, at the head of the Gulf of Suez. The distance from England to Bombay was 11,000 miles round the Cape, but by the canal it is only about half that distance. Sailing ships often go round by the Cape to avoid paying heavy canal tolls, but steamers find it cheaper as well as quicker to pay them and save the distance of over 5,000 miles.

79. The African Straits. Narrow seas separate Africa from Europe and Asia. The Strait of Gibraltar, leading to the Mediterranean Sea between Spain and Northern Africa, is only 9 miles wide. The strait between Africa and Arabia is 14 miles wide, and is so shallow and dangerous that Arab sailors named it Bab-el-Mandeb, the 'gate of tears'. Both the Mediterranean and the Red Seas are nearly landlocked, and they are so small in comparison with the surrounding lands that they hardly affect the climate. This is especially true of the long narrow Red Sea.

Photograph by Underwood & Underwood

Fig. 18. The Suez Canal

80. Height of Africa. All the other continents have large lowlands. Africa has none. The land under 600 feet is left white in the coloured map, but it is a mere fringe along the coasts. Nearly all the continent is coloured brown. The light-brown land is under and the dark-brown land is over 3,000 feet high. Compare the area and position of the light-brown and dark-brown land. The land over 10,000 feet high has been coloured a still darker shade, but its area is very small. It is well shown in the Oxford Wall Map of Africa. Most of Africa consists of high tablelands or plateaus, which are highest in the south and east. Northern Africa is lower. All the rivers rise in these high plateaus, and form falls and rapids in their steep descent to the coastal lowlands.

81. The Atlas Mountains. These are not tablelands, but form part of a ring of mountains which once enclosed the whole of the Western Mediterranean. They are continued by the mountains of Southern Spain, Sicily, and Italy. These are now separated by sea where the land has sunk. The islands are the higher peaks of the submerged part of this mountain girdle. Earthquakes are common on the mainland and islands of Southern Italy, showing that the crust of the earth is liable to constant changes in this region.

82. The Rift Valleys of Africa. Violent changes have also taken place on the mainland of Africa. Parts of the continent have sunk down, forming deep rifts or depressions, shut in by high plateaus. A glance at the coloured map shows how many lakes there are in Central Africa, and that they differ in shape. Some are almost as broad as they are long, while others are long and narrow and very like the Red Sea in shape. The largest of the first group is Lake Victoria, which is

as large as Scotland. The longest of the second group is Tanganyika, which is 400 miles long. Compare its shape with that of Lake Nyasa and the Red Sea. These long narrow lakes fill the deepest parts of two rift valleys which are continued towards the Mediterranean by the rift valleys of the Red Sea, the Dead Sea, and the Jordan Valley. Many volcanoes, both active and extinct, are found along these rifts. Kilimanjaro rises to 19,000 feet, and Kenya to 17,000 feet above the eastern rift valley. Both are extinct volcanoes. Ruwenzori, a vast snow-clad volcanic group, towers to nearly 17,000 feet above Lakes Edward and Albert in the western rift valley. There are active and extinct volcanoes near Lake Kivu, a smaller lake in the western rift valley. The Abyssinian Highlands, near the northern end of the African rift valleys and west of the Red Sea rift, are also volcanic.

83. Volcanoes of Western Africa. Notice how abruptly the coast of Africa changes its direction about lat. 5° N. Here the volcanic Kamerun peak rises to over 13,000 feet. Many islands off the west coast are also volcanic.

84. African Rivers. Find the longest African rivers on the coloured map, and trace their main streams and tributaries. Compare their direction with the arrangement of high and low ground. The Nile, Congo, and Zambezi rise south of the equator, in a high region which has heavy equatorial rains, and carry much water to the sea. The divides between them are little higher than the general level of the plateau, and in the wettest months the flooded lakes and swamps are drained to all.

85. All the African rivers flow through regions which have well-marked wet and dry seasons, and their volume varies greatly in different months. The Congo varies

least, for its course is entirely in the equatorial rain belt. The Nile varies most, and its annual floods, on which the fertility of Egypt depends, puzzled the world for thousands of years. In the drier regions of North and South Africa the river-beds contain little water.

86. Natural Regions of Africa. Africa has a tropical climate except in the extreme north and south. Central Africa, however, is very high, and the heat is less intense than in the lower deserts to the north. The seasons differ more in rainfall than in heat, and this affects vegetation (chaps. v, vi). The vegetation divisions are more important than any political ones.

87. Political Divisions. France has colonies on the Mediterranean Sea, on the northern margin of the great desert. Italy has a colony on the Red Sea. South of the desert Africa has been divided up between Britain, Germany, France, Belgium, and Portugal.

Exercises

1. Draw a map of Africa, shading all the land over 3,000 feet.

2. What is a rift valley? Describe the rift valleys of Africa? Do rift valleys occur in other parts of the world?

3. It has been said that Africa begins south of the Atlas Mountains. Explain what this means.

4. Mark the chief African rivers on a map, and put in their chief tributaries.

5. Make a map to show the political divisions of Africa among the European powers.

6. Explain what has been gained by cutting the Suez Canal. Do you know of any similar barrier to communication? Use the globe in answering this question.

CHAPTER VIII

THE ATLAS COUNTRIES

88. The Atlas Countries. Find on the coloured map the State of Morocco, the French colony of Algeria, and the French protectorate of Tunis. (Morocco is both an Atlantic and a Mediterranean country, but Algeria and Tunis open only to the Mediterranean.)

89. Morocco, Algeria, and Tunis lie in the same latitudes, and consist of three well-marked natural regions. (The first includes the fertile valleys along the northern coast, enclosed by the lower ranges of the Atlas. Farther inland are the mountains and table-lands of the High Atlas. Much of this region is steppe. South of the Atlas is the Sahara, the great desert which extends across Northern Africa.) The desert is a no man's land, in which there are no definite political boundaries. There are few European settlers in Morocco, but many French, Spanish, Italians, and Jews live in Algeria and Tunis. The natives are Arabs and Berbers, both belonging to the white race, and Mohammedan in religion.

90. The Atlas Mountains. The Atlas ranges and plateaus stretch for 1,500 miles, from the Atlantic coast opposite the Canary Islands to Cape Bon on the African side of the Sicilian Strait. In Morocco high parallel ranges run north-east. There are peaks over 13,000 feet high, and passes over 7,000 feet high, or about as high as the most frequented parts of the Swiss Alps. The highest range, called the Great Atlas, is rarely under 10,000 feet high, and the peaks are always covered with snow. The northern slopes of the Atlas are covered with forests of trees like those of Southern

Europe, but the slopes facing the Sahara are drier and barer. High plains are enclosed between the ranges.

91. In Algeria the Atlas forms a broad high tableland nearly 100 miles across. This sinks by steep ranges to the Mediterranean on the north and to the Sahara on the south. The northern ranges run north-east, and form headlands and sheltered bays along the coast. This northern region of valleys and coastal ranges is called the Tell, and contains most of the people and all the towns. The interior consists of tablelands covered with steppe grasses. The rivers rise there and flow north and south, cutting steep ravines and gorges through the bordering ranges. Those which flow to the Sahara are lost in the desert sands.

92. In Tunis the Atlas forms a low broken plateau, with Cape Bon as its seaward end. Fertile coast, steppe interior, and desert succeed each other to the south.

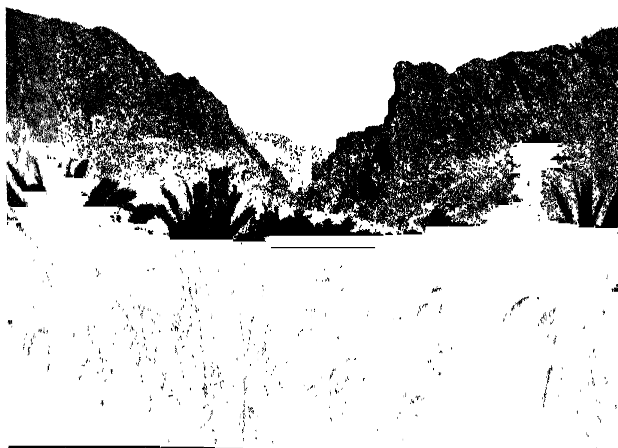
93. Climate. All these lands have what is called a Mediterranean climate. The summers are hot and the winters mild, and frosts are almost unknown at sea-level. The prevailing westerly winds bring rain in winter, but the summers are dry, for the trade winds then blow as far north as the Mediterranean.

94. The rivers vary greatly in volume at different seasons. Those of Morocco, which rise in the snowy Atlas, are fullest in early summer, when the snows melt. Much water is drawn off to irrigate the land, much evaporates under the warm summer sun, and some sinks through the loose sandy river-beds. Very little reaches the sea. The rivers of Algeria and Tunis carry little water in the hottest months. Many flow at the bottom of deep gorges, and are of little use as routes. Such rivers cannot be utilized for irrigation except in their flat lower valleys.



Photograph by A G Collier

Fig 19 An Oasis Village and its Gardens



Photograph by A G Collier

Fig 20 The Gorge of El Kantara

95. Forests and Cultivated Plants. The northern ranges were once forested with cedars, cork, and other evergreen oaks, mixed with gummy or fleshy plants adapted to a dry summer. Their roots bound the soil together and prevented it from being washed away in the rainy season. Where they have been cut down there is only a thin layer of soil, which holds hardly any moisture. More of these forests remain in Morocco than in Algeria and Tunis, for the Berbers, who are most numerous in Morocco, till the soil, and leave the forests. Farther east Arabs are more numerous, and they prefer the keeping of animals to agriculture. They have destroyed the forests of Algeria and Tunis to get more pasturage for their animals. The French are striving to increase the amount of irrigated land and to improve agriculture. Wheat, maize, millet, hemp, tobacco, oranges, figs, almonds and other fruits are grown. The vine suits the climate so well that Algeria is becoming one of the great wine-producing countries of the world. The carob bean is grown for fodder, and lentils, pease, and haricot beans are important crops. The higher steppes of the interior are covered with alfa or esparto grass, whose strong dry fibres are made into paper. Immense quantities are exported to England. On the desert margin and in the oases the date palm is grown.

96. Animals. The lion, panther, hyena, bear, jackal, antelope, gazelle, are among the wild animals found in the Atlas. Swarms of locusts often come up with the hot dry south wind, and destroy the crops. These are kept down by birds, and especially by the storks, which fly south to the Mediterranean in winter. The cuckoo and swallow also winter there.

97. Towns and Routes. Each race and region has its special type of life. The agricultural Berbers live

in small fortified villages. The trading Arabs live in the towns, and the wandering Arabs are tent-dwellers who pasture their animals in the steppes and deserts. The Europeans are farmers and merchants, and have their own quarters in the larger towns. Shade is greatly desired in the hot summer, and in the native towns and villages the streets are very narrow. The houses are high and almost windowless, and are painted white for coolness. The richer people have high-walled gardens. Veiled women fetch water in brass or earthen jars from drinking fountains in the small open squares. Goods are sold in covered bazars, or streets of windowless shops. The mosques, or Mohammedan places of worship, are dark and cool, with rounded arches inside, and domes and tall slender minarets outside. The European towns and streets are wider and cleaner, and the walls of the houses are painted white.

98. There are no railways and few roads in Morocco, but in Algeria the French have made good roads and some railways. The valleys of the Shelif river in Algeria and of the Majerda in Tunis run parallel to the coast, and form a railway route from east to west. The most important line across the Atlas goes by the gorge of El Kantara to Biskra on the edge of the desert. Great hotels are built among the palm trees and are crowded by tourists in winter.

99. Morocco. Morocco is both fertile and rich in minerals. The people are semi-civilized, and very hostile to Europeans. Their manufactures are remarkable for artistic skill. The wool and hair of animals is woven into carpets and rugs, and the skins are tanned into Morocco leather, which is dyed and richly ornamented. Crops of many kinds are grown where irrigation is possible. All the largest towns are inland near the foot

of the Atlas ranges. Fez, Mequinez, and Morocco City are each the seat of the Sultan's court for a part of the year. Fez lies 1,300 feet above the sea in sight of the snowy Atlas. The neighbouring hills are terraced and planted with olives, vines, and other fruits, and the surrounding plain is irrigated and cultivated. Silk, leather, and red caps called after the town are manufactured at Fez. Morocco City lies in a broad irrigated plain shut in by ranges of the Atlas. The largest coast town, Tangier, almost opposite to Gibraltar, is practically a European town with an Arab quarter. Ceuta is a fortified town belonging to Spain. The Atlantic coast has no good harbours. The chief port is Mogador, and farther south is Agadir, which might be made into a harbour.

100. Algeria. Algiers, the largest town, is built on a circle of hills round a beautiful bay. The European town is on the lower slopes, and above is the native town, crowned by the ruined capital of the Deys of Algiers. The Algerians carried on piracy in the Mediterranean until 1830, when the French bombarded Algiers, and began the conquest of Algeria. A few years later they took Constantine, an inland town, which commands all the Tell. It is built on a height above a deep ravine, and has been a great stronghold for more than 2,000 years. All the Tell is covered with ancient ruins, showing that it was once very densely peopled.

101. Tunis. Tunis, the capital, is the second port of Northern Africa, though the harbour is not good. The town is built along the shores of the lagoon of Tunis. It is near the site of ancient Carthage, which, like Tunis, commanded the strait between the eastern and western Mediterranean. Bizerta, north of Tunis, has a magnificent natural harbour.



Photograph by A. G. Collier.

Fig. 21. Constantine.



Photograph by A. G. Collier.

Fig. 22. A Ruined Roman City in the Desert.

Exercises

1. Draw a map of Northern Africa, shading the land over 3,000 feet high. Mark Mogador, Fez, Tangier, Algiers, Tunis, the Majerda river, and Tripoli.
2. Show how the plants of the Atlas countries are suited to the climate.
3. Give some reasons to explain why the religion of Mohamet has spread all over Northern Africa.
4. Where are the following occupations important, and why—vine-growing, tanning, hotel-keeping, carpet-making? Answer as fully as you can.

CHAPTER IX

THE SAHARA

102. The Sahara. The desert of Northern Africa is called the Sahara, from an Arabic word meaning 'a waste'. Different parts have names of their own; e. g. the Libyan desert west of the Nile, or the Nubian desert east of it. The desert of Arabia is a continuation of the Sahara.

103. The rocks which form the surface of the desert weather much faster than they would do if they were protected by plants. They become intensely heated during the day and are quickly cooled after sunset. This alternate heating and cooling splinters off fragments which gradually weather down to fine sand. The winds carry away the lighter sand, but the larger heavier fragments are left. Vast tracts of the Sahara consist of stony desert like that shown in the foreground of Fig. 23. The same picture shows how the winds heap the sands up into hills or dunes which in some places

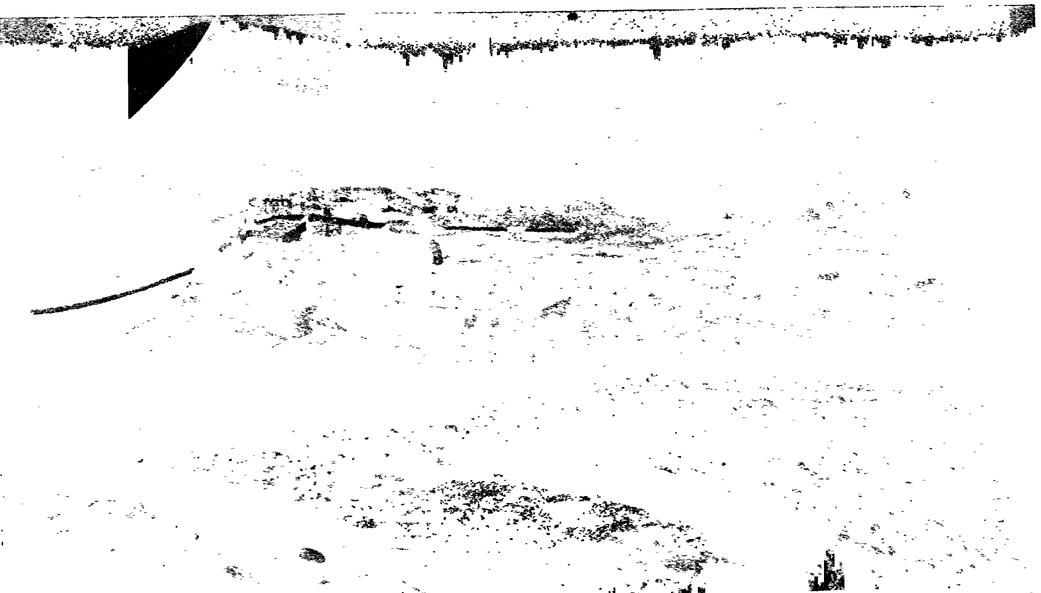


Photo. by M. Gourand. From the Atlas photographique des Formes du Relief terrestre (Boissonas et Cie, Geneva). By permission of Professors Brunhes, Chaix, and de Martonne.

FIG. 23. A VILLAGE IN THE SAHARA.
Notice the sand-dunes behind and the stony desert in the foreground.

are 500 feet high. Sand dunes cover large areas in the Libyan desert and in Morocco and Algiers south of the Atlas.

104. The weathering of the rocks and the action of the wind carves the surface of the desert into heights and hollows. Many hollows are filled by salt lakes and marshes. The most important heights are the Tibesti Highlands, which cross the Central Sahara. They are nearly 1,000 miles long and rise to 7,000 feet.

105. **The Desert Climate**. The Sahara lies in the track of the north-east trade winds. These bring little rain even to the eastern margin. The Atlas Mountains keep off rainy winds from the Atlantic. The dryness is increased by the great distance of the interior of the desert from any sea. Rain falls on the margin and on the Tibesti and other highlands, but elsewhere months or even years may pass without a shower. The Sahara has been much lowered by weathering, and when it stood higher enough rain may have fallen on the highest parts to feed permanent rivers. Now most of the watercourses, or wadis, are empty except after storms. Then they are filled for a short time by fierce torrents, for the water runs off the baked ground instead of sinking through it. The wadis are moister than other parts of the desert, and are often fringed by trees or bushes. Notice that a line of palms fringes a wadi in Fig. 23.

106. The desert sky is cloudless and the heat of the Sun is very great, especially in summer, when the Sun is vertical over the Tropic of Cancer. The nights are cool or cold. The hot air rises during the day and the shimmering light often forms a mirage in which the traveller seems to see vague shapes of palms or distant villages. The winds are laden with sand, which irritates the eyes and

makes blindness common. Many desert dwellers veil their faces to keep the sand out of their nostrils, eyes, and ears. Sometimes a strong wind whirls along so much sand that travellers cannot see more than a yard or two before them. Neither man nor beast can stand erect while a sand-storm is raging.

107. Hot dry winds blow outwards from the desert. That which blows north is felt as a hot dry south wind as far north as Italy, where it is called the sirocco (pronounced schirocco). In Egypt it is called the khamsin. The hot dry wind which blows south is felt as a north wind on the Gulf of Guinea, and is there called the harmattan.

108. Plants and Animals. The Sahara is a desert because it is rainless, but water makes it very fertile. In dry countries the soil retains those chemical plant-foods which are washed out of it by rain in wetter lands. Springs gush out along the base of the Atlas and of the Tibesti and other highlands, and these create oases. Where there are no springs deep wells can sometimes be sunk to the underground water which underlies parts of the Sahara.

109. The true desert produces dry thorny gummy plants and coarse dry grass. These are grazed by camels and goats. There are few plants of any kind in the sandy and stony areas. In the oases the date palm is the most important tree. An Arab measures the value of an oasis not by its size but by the number of its date palms. These are planted as thickly as possible, and crops are grown beneath their shade. The date requires abundance of water round its roots, but its sugary fruit is spoiled by a single shower. It is perfectly fitted to live in a region where all the water gushes up from the ground, instead of falling as rain.

Wheat, millet, tobacco, cotton, hemp, and many fruits and vegetables are grown in the larger oases, as well as lucerne for fodder. Water, and not land, is coveted as property in the Sahara. Any one may take as much unirrigated land as he likes for his own, but to steal water is a crime.

110. The desert animals are tawny and dull in colour like the desert. All are swift and able to live for a long time without water. Camels are the chief source of wealth outside the oases. A she-camel gives enough milk to feed a foal and one person for a year, and a few camels support a whole family. Animals are too valuable to be killed for food, but milk and cheese are eaten. In the date season the desert dwellers crowd into the oases to lay in a store of dates for themselves and their camels.

111. Desert Life. The oasis dwellers cultivate the soil, and live a settled life in villages of mud houses surrounded by high mud walls. In the larger oases some villages have handsome mosques and good houses. The desert dwellers follow their animals from pasture to pasture. They live in tents, which can easily be taken down, laid on camels, and set up in another place. The tents are of skins, which are also made into bottles for holding milk or water. Skin bottles can easily be replaced when they are worn out, and they do not break if the camel jolts its load.

112. Trade, Routes, and Towns. The desert produces salt and skins, and the oases yield dates and other cultivated plants. These are carried on camels to the fertile lands north and south of the desert and exchanged for other wares. Caravans from the Mediterranean bring fruit, manufactured goods, and even such luxuries as tea across the desert. Caravans from the south carry

gold dust, ivory, ostrich feathers, and other precious things north to the Mediterranean. A caravan consists of hundreds of merchants or pilgrims with their camels. There is safety in numbers, for the fierce desert tribes often attack and plunder small caravans. The caravan leaders find their way by noticing such landmarks as sand dunes, rocky hills, bushes, or the whitening bones of men and camels. Tripoli, on the Mediterranean, the capital of the State of the same name, is the starting-point of important caravan routes across the Sahara.

113. Wargla and Turgurt, both irrigated from deep wells, are the largest oases in the French Sahara. Tafilet, the largest oasis in Morocco, contains many villages, and about 450 sq. miles are planted with date palms. Tafilet dates are exported in large quantities to Europe. Timbuktu, about 1,000 miles south of Tafilet on the edge of the desert, a few miles from the Niger, trades in salt and is an important market.

Exercises

1. Describe fully the desert climate.
2. Show how the life of desert-dwellers is well adapted to the conditions of the desert.
3. Explain the text (Luke v. 37), 'No man putteth new wine into old bottles, else the new wine will burst the bottles'.
4. Show how the plants and animals of the desert are specially suited to it. Name the most important plant and the most important animal. Give your reasons.
5. How is trade carried on in the desert?
6. Write a full description of the illustration on page 51.

CHAPTER X

EGYPT AND THE NILE

114. The Nile. The Nile is 3,500 miles long, and flows for the last 1,500 across a desert. This seems strange, but it is still stranger to find that in this rainless region it overflows its banks every summer and turns a strip of desert first into a lake and then into a garden. We should not have expected to find a great river in the desert, and still less should we have expected it to carry so much water in the driest part of its course.

115. Two facts have to be explained. How is it that the Nile reaches the sea all the year round instead of losing itself in the desert? Secondly, why does it rise 20 or 30 feet in summer? To explain the first, we must find some cause which affects the Nile all the year round. To explain the second, we must find one which acts only during the summer of the northern hemisphere.

116. First, let us see what the coloured map can tell us. It shows that the Nile rises south of the equator at a great height. As it flows north it has a long course in the equatorial belt of constant rain, and receives many tributaries in the same wet region. The equatorial rains fall throughout the year and they supply the permanent stream of the Nile. If the Nile had risen a few degrees farther north it would have had a much shorter course in the wet belt, and would have received fewer tributaries. In all probability it would have reached the sea only during certain months of the year.

117. Next let us see whether the map suggests any explanation of the summer floods. These occur in the northern summer, when the sun is nearly vertical over the Tropic of Cancer. This is the rainy season in

tropical lands north of the equator. Has the Nile any large tributaries in the latitudes which have summer rains? If so they might bring in the water which causes the summer floods of the Nile. The map shows that the Nile receives several tributaries in tropical latitudes. Which of these are most likely to cause the summer floods? Not those which flow through low or flat regions, for they would get rid of their surplus water by overflowing their own banks, and would carry little extra water to the main stream. The tributaries which bring down the flood-waters are most likely to rise in a high region, where the rainfall is heaviest, and to flow in steep narrow valleys where they cannot overflow. The coloured map shows that Abyssinia is the only high region in tropical latitudes north of the equator which is drained to the Nile. We may assume that it is the Abyssinian tributaries which bring down extra water in summer and cause the Nile floods.

118. The Sources of the Nile. Find the sources of the Nile in the coloured map. It rises on the high lake plateau of Central Africa, where Lake Victoria, or the Victoria Nyanza, lies 3,800 feet above the sea. Many rivers flow into Lake Victoria. The Kagera, the longest, is generally taken as the head-stream of the Nile. The Nile leaves Lake Victoria as a broad river nearly half a mile wide, and begins its steep descent to Lake Albert by flinging itself down the Ripon Falls. Lake Albert lies 1,500 feet below Lake Victoria in the western rift valley. It also receives many rivers, all of which feed the Nile. Find Lake Albert on the map, and notice that it receives the waters of Lake Edward, which lies to the south in the same rift valley, 1,000 feet higher. The river which connects the two lakes receives many streams from the snows of Ruwenzori (§ 82).

119. Gathering up the waters of these mountains, rivers, and lakes, the Nile leaves Lake Albert and descends by falls and rapids to the level savanas of the Egyptian Sudan. There it becomes a sluggish river, choked by floating islands of dense vegetation, which have been torn from its swampy banks. These form the Nile sudd, and are the home of the hippopotamus, the crocodile, and even of hunting and fishing negro tribes. On the left bank the Nile receives a sluggish tributary called the Bahr-el-Ghazel, or Gazelle river, which is also blocked by sudd. Then it widens out to the papyrus swamps of Lake No. The ancient Egyptians used the papyrus instead of paper, and we have taken the name. In the sudd region fishing is the chief occupation of the negro tribes who live along the rivers.

120. The Nile flows for about 1,000 miles across the Sudan to Khartum, on the southern edge of the desert. During this part of its course it receives tributaries which rise in the volcanic Abyssinian Highlands, 6,000 to 8,000 feet above the sea. These bring down an enormous amount of water during the rainy summer season, but in winter they are dry or a mere string of pools.

121. Find these flood-bringing Abyssinian tributaries on the map. The first is the Sobat, which enters the Nile 500 miles above Khartum. In the wet season it is almost as large as the Nile. At Khartum the strong, swift, Blue Nile rushes into the main stream, or White Nile, with so strong a current that it pushes back the waters of the more sluggish river. The last Abyssinian tributary is the Atbara, which enters 200 miles below Khartum. After this the Nile receives no more tributaries, for its course is across the desert.

122. The Gift of the Nile. Water is not all that the Abyssinian tributaries give to the Nile. They also

bring down the rich red-brown mud out of which inhabited Egypt has been built up. The Abyssinian Highlands are volcanic, and the rock waste which the rivers carry is rich in chemical substances which plants require. The quality of the mud which the Nile spreads out over Egypt every year is at least as important as the quantity. It makes Egypt more fertile, acre for acre, than almost any other land. Herodotus, one of the earliest of travellers, was right when he called Egypt 'the gift of the Nile'.

123. The Cataracts. The Nile has still to fall about 1,000 feet before it reaches the Mediterranean. The map shows that Khartum is on the same meridian as Cairo, but the Nile has a very winding course between the two cities. It has cut its valley through the limestones and sandstones of the desert, which form high cliffs on both sides. Beyond, on the east, the Nubian Heights rise to 7,000 feet, and cut the Nile off from the Red Sea. The Peninsula of Sinai, which is part of Egypt, is still higher. On the west the Libyan hills are lower and the desert sinks to a depression in which are the Libyan oases. Purple porphyry, milky alabaster, and other beautiful stones are found in this desert.

124. In its course of 1,300 miles between Khartum and Aswan the Nile falls over 800 feet. Its bed is broken by reefs of rock which are bare in the dry season but covered when the Nile is high. These reaches of broken water form what are called the six cataracts, though there are no actual falls. The lowest or First Cataract, which is in Egypt, has a fall of 16 feet in about three miles. Aswan lies at the northern end. The ruins of many temples show that this place, where the upstream navigation of the Nile is first interrupted, was important thousands of years ago.

125. The Nile in Egypt. Below Aswan the almost level valley of the Nile forms Upper Egypt. It is from 5 to 10 miles wide and covered with deep alluvial soil. The desert stretches away on either side, beyond the cliffs which shut the valley in. Here and there villages are built on mounds above the flood-level. Groves of palms, groups of peasants at work, and strings of camels are all that break the monotony of the landscape.

126. The Nile Delta. The Nile delta forms Lower Egypt. Most of the Nile water reaches the sea through the Damietta and Rosetta branches, or distributaries. The other distributaries have been choked by the mud which the river brings down, and form lagoons along the coast. West of the delta is the irrigated depression of the Fayum.

Exercises

1. Draw a map of the course of the Nile and its tributaries, shading the land over 3,000 feet.
2. How do you account for the great length of the Nile?
3. How is its permanent flow supplied?
4. How are the Nile floods caused?
5. What did Herodotus mean when he called Egypt "the gift of the Nile"?
6. Describe what the Nile would have been like if, rising where it does, it had flowed south instead of north.

CHAPTER XI

EGYPT

127. The Seasons in Egypt. Egypt lies north of lat. 22° N., i.e. almost entirely north of the Tropic of Cancer. It has hot summers and warm winters. Very little rain falls except along the Mediterranean coast. The seasons are marked by differences in the height of the Nile, for Egypt depends entirely on the river for its existence. Summer, the hot dry season, when the Nile is lowest, lasts from the beginning of April to the end of July. The season of high Nile lasts from the beginning of August to the end of November. Winter, the coolest season, when most of the land is under crops, lasts from December to the end of March.

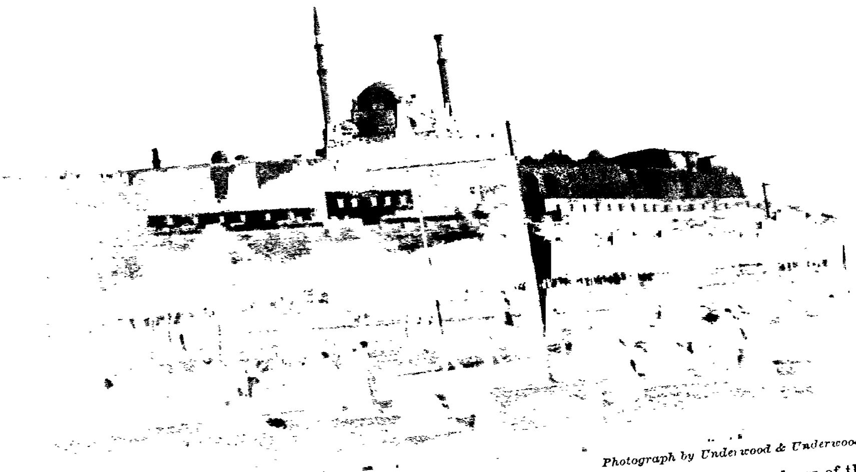
128. The Rising of the Nile. As the time draws near for the river to rise it is eagerly watched, for the harvests depend on the abundance of flood-water. Gauges to measure the height of the rising river have been set up along the main stream and the tributaries, and the height of the water is telegraphed to Cairo every day. The Sobat comes down in flood earlier than the Blue Nile, and the Blue Nile earlier than the Atbara. The first sign of a rise is seen at Aswan in May, but at Cairo the river does not begin to rise until a month later. The Nile is highest at Aswan in the middle of September, when the rainy season of the northern hemisphere is just over. At Cairo it is highest in the middle of October. After this the water begins to fall. In a poor year, when the Nile rises only about 21 feet, some land remains uncultivated because there is not enough water to reach it. In a good year

the river rises 26 or 27 feet, and there is abundance of water for all the cultivated land. Higher floods may be dangerous.

129. How the Nile Waters are Used. As Egypt is rainless all cultivated land is irrigated from the Nile. Some of the irrigation canals are supplied from the permanent flow of the river, and are full all the year round. They are called summer canals, because they contain water even in the summer when the Nile is lowest. As they must reach the lowest level of the Nile they are cut very deep, and smaller canals branch off from them in all directions. The Fayum, Lower Egypt, and parts of Upper Egypt are irrigated in this way. The rest of the country depends entirely on the flood-waters. The flood canals are much shallower than the summer canals, for they tap the rising river. They contain water only during the season of flood. The lands along the river are divided by high banks of earth into enclosures or basins. The flood-waters are first admitted to the basins nearest the river. When these are flooded to a depth of 4 or 5 feet the water is allowed to pass into basins farther from the river. The whole country looks like a lake, with villages rising above it. The water remains on the land for about six weeks, and at the end of this time it is thoroughly soaked. It is a great advantage to have a frontage on the Nile, and most holdings have a narrow strip along the river and run back a long distance from it.

130. After about six weeks the level of the water in the basins begins to fall and the soaked land is gradually uncovered. The fine mud brought down by the flood-waters forms a layer of fresh soil, and crops are planted in it in October and November.

131. Land which is irrigated all the year round pro-



Photograph by Underwood & Underwood

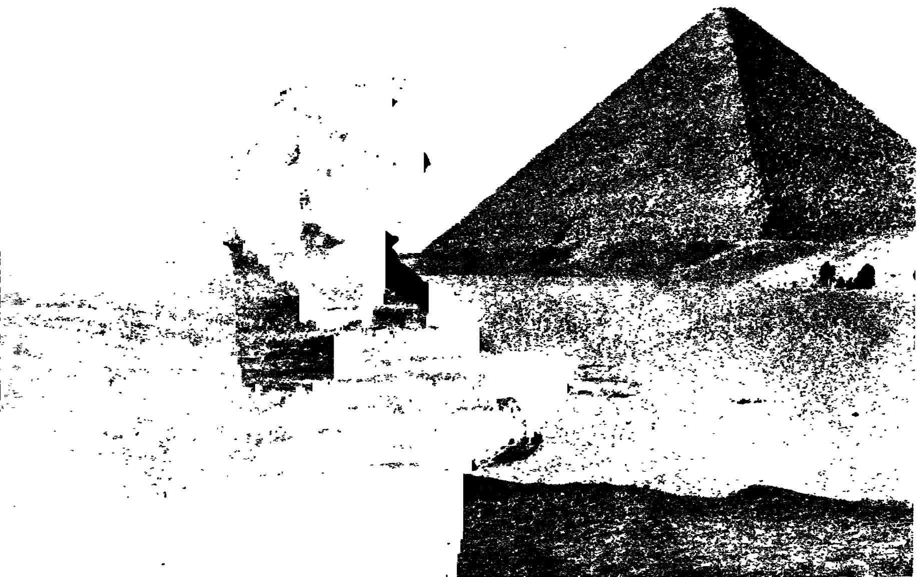
Fig. 24. Citadel of Cairo.

Notice the tall minarets and domes characteristic of Mohammedan architecture, and the dress of the people. You will see from it that only one or two are Europeans.

duces two or three crops a year, while lands irrigated by the flood-waters produce only winter crops. Cotton, the most valuable Egyptian crop, can be grown only on land which is irrigated by summer canals, for it needs abundant moisture in May and June when the Nile is lowest and the flood canals are empty. The British rulers of Egypt have spent immense sums to obtain more water for permanent irrigation. A high dam has been built across the river at Aswan to deepen the water behind and form a great reservoir. The water is allowed to pass by sluices into the irrigation canals, and the supply is very carefully regulated according to the height of the river. Another important dam at the head of the delta fills the summer canals of Lower Egypt.

132. These costly engineering works are a great contrast to the simple methods practised by the peasantry. Some of these are as old as Egypt itself, and are used in many other parts of the East. A common method is to fix buckets on a revolving wheel, which is turned by an ox or buffalo. Each bucket in turn is dipped into the water, filled, emptied as the wheel rises, and sunk and filled once more. A simpler method still is to fix a bucket to the end of a long pole, which is raised and lowered by hand.

133. Egyptian Crops. Cotton has been grown in Egypt for hundreds and perhaps thousands of years. Its fibre is short but very silky, and 'mercerized' cotton goods made from it look almost like silk. The seeds are crushed for oil, which is used for cooking, for making oil-cake to fatten cattle, and in soap. Sugar, rice, and vegetables are other summer crops. The winter crops are wheat, maize, millet, clover, pulses or pod-bearing plants (lentils, beans, &c.), flax, onions, and other vegetables. Only winter crops are grown on the basin lands.



Photograph by Fradelle & Young.

Fig. 25. The Sphinx and the Pyramids.
Notice how entirely desert the surrounding country is.

134. Occupations of Egypt. Most of the peasants or fellahin are farmers. There are wandering pastoral Arabs on the desert and settled Arabs in the towns. The British fill the most important official posts, and are also engaged in trade. There is a British army of occupation. Many southern Europeans are merchants and traders in the towns.

135. The larger towns have a native quarter, with mosques, bazars, and narrow streets, and a cleaner but less picturesque European quarter. The natives do beautiful work in silk, metal, and inlaid wood. Among the other industries are the crushing of oil-seeds, flour-milling, sugar-refining, soap-making, brewing, tanning and the making of perfumes from roses. Outside towns the life has changed little for thousands of Egypt is famous for its colossal pyramids and temples, which have been preserved against deca the dry climate.

136. Routes and Towns. Alexandria, on a spit of land between the Mediterranean and the marshes of the delta, is the chief port of Northern Africa. It is connected by canal with the Rosetta mouth, 35 miles to the east. Port Said, at the Mediterranean entrance to the Suez Canal, is a port and coaling station, and much more important than Suez, at the Red Sea ; and Cairo, the capital, at the head of the delta, is built where routes across the desert from east and west reach the Nile. The Great Pyramid and the Sphinx are a few miles distant in the desert. The Nile is the one great natural route, and the larger canals are also navigable. A railway follows the Nile valley to Aswan, which is about 700 miles by rail from Cairo. This will be connected with the Sudan lines (§ 144), and with that being built northwards from Cape Town (§§ 189, 206).

Exercises

1. Describe the seasons in Egypt.
2. How are the flood-waters of the Nile used ?
3. How is the permanent flow of the Nile used ?
4. Describe the different crops raised in Egypt. With what other countries would you compare Egypt ?
5. Why is little or no wine made in Egypt ?
6. Draw a map showing Alexandria, Aswan, Cairo, Port Said, and the Suez Canal.

CHAPTER XII

THE SUDAN

137. The Sudan. The Sudan, which means 'the country of the blacks', lies between the deserts of Northern Africa and the forests and high plateaus of Equatorial Africa; that is, between lat. 20° N. and lat. 10° N. It does not include Abyssinia or the Italian colony of Eritrea on the Red Sea.

138. Abyssinia. Abyssinia is a half-civilized independent State, professing a corrupt form of Christianity. The country is a plateau, much of which is 8,000 feet high, with volcanic heights rising to 15,000 or 16,000 feet. In the middle of the country is Lake Tsana (1,200 square miles), which is drained by the Blue Nile. Abyssinia has very heavy summer rains and a fertile volcanic soil. Coffee, which is a native of the country, is the chief crop. Some parts of Abyssinia are forested and yield precious gums, and others are rich in gold. The capital is Addis Abbeba.

139. Climate and Vegetation of the Sudan. The Sudan lies in latitudes which have well-marked wet and dry seasons. The north is dry, but the summer wet season becomes increasingly marked towards the south. The heat is always great. Most of the Sudan is a savana, which passes on the south into the hot wet forests of the Upper Nile, the Congo, the Niger, and other Guinea rivers.

140. In the drier scrub lands of the north Arab shepherds and traders keep camels and goats. Along the rivers the land is irrigated and planted with millet, cotton, indigo, &c. Irrigation requires much labour for a reward in the distant future, and wherever it is pra tised the people rise in civilization. The negro tri the Southern Sudan, where the yam and banan wild, or can be grown with little trouble, are inferior to the grain-growing peoples of the healthier north.

141. Divisions of the Sudan. The Sudan consists of (i) the Egyptian or Eastern Sudan in the Nile basin, administered by Britain ; (ii) the Central Sudan, between the Nile and the Niger, divided between France and Britain ; and (iii) the Western Sudan, most of which is French.

142. The Egyptian Sudan. The Egyptian Sudan extends southwards from Wadi Halfa, at the foot of the Second Cataract of the Nile, to within 350 miles of the equator. It is about a quarter of the size of Europe (1,000,000 square miles), but has only a third of the population of London. It rises on the east to the Abyssinian plateau, and on the south to the lake plateau of Central Africa. The Nile, which flows north across successive belts of forest, savana, swamp, scrub, and desert, links the Southern Sudan with the Mediterranean.



Fig. 26. In the Drier Scrubland of the Egyptian Sudan.



Fig. 27. Dead Elephant shot in the Savanas of Northern Nigeria.

In the unhealthy swampy region of the Bahr-el-Ghazel constant care is needed to keep the channel open and free from sudd (§ 119).

143. The Egyptian Sudan has little to export. The drier forests supply gums and the wetter ones rubber. The lion, rhinoceros, leopard, giraffe, antelope, gazelle, and ostrich are found in the savanas, and the hippopotamus and crocodile in the Nile swamps. Ostrich feathers, hides, and ivory are exported.

144. Khartum, the capital, is built on a tongue of land between the Blue and White Niles, where many routes reach the river. A railway runs by Berber to the great bend of the Nile, and then strikes across th desert to Wadi Halfa. This will some day be conn with Aswan and the Egyptian lines. A branc from Berber to Suakin (Port Sudan), the Red Sea

145. The Central Sudan. Lake Chad, whic no outlet to the sea, lies near the middle of the Centra Sudan. Its shores bound the French Sudan, which extends to the Senegal, Northern Nigeria (British) and the Kamerun Colony (German).

146. Northern Nigeria. On the coloured map find the Niger and its tributary the Benue. The most fertile part of the Central Sudan lies between these two rivers, and is British. It was divided formerly among many half-civilized Mohammedan States, of which Hausaland was the largest. The Hausas are a fine race both in body and mind. Like all the tribes of Northern Nigeria they have dark skins, but they have not the projecting lips and the woolly hair of the true negro. They make good soldiers, and at the height of their power controlled many routes across the desert from the Sudan to the Mediterranean. They are also eager traders, craftsmen, and tillers of the soil.

147. Kano. Kano, the largest town of Northern Nigeria, is one of the great markets of Africa. It is the place where the products which have been brought south across the desert are exchanged for those which have been brought north from the forests and savanas of the south. Caravans and traders come from all the Mediterranean towns, Lake Chad, and the Guinea and Atlantic coasts. Two great staples are blue Kano cloth and kola nuts. Kano cloth is made at Kano, of local cotton dyed with local indigo. It clothes millions of people in Northern Africa, and can be bought in every place of any size from Alexandria to Lagos on the Guinea Coast.

8. The Kola Nut. This grows in the hot wet of the Gold Coast and not in the Sudan. The hich contain the nuts are not unlike a chest- n shape. The nuts are packed in baskets, and covered with fresh green leaves to keep them moist. They are used all over the Sudan, and enable men to bear hard work and great fatigue on a scanty diet. By the time they reach the Sudan the cost of carriage has made them very dear. Nuts which cost 5 cowries near the coast fetch from 50 to 250 cowries at Kano, and still more on the shores of Lake Chad.

149. Cotton. Cotton is a native plant in Hausaland, where it finds exactly the climate it prefers. The summer rains fall between May and September, when cotton needs moisture, and cease just when dry weather is wanted for picking the pods. Much more would be grown if labour could be obtained. Under native rule the ground was tilled by slaves, but under British rule slavery is not legal. As time goes on Northern Nigeria will supply more and more cotton to the mills of Lancashire, which make cotton goods for our export trade.

150. British Rule in Northern Nigeria. A handful of British officials administer Northern Nigeria, and their task is not easy. They have to preserve whatever is good in native usage; to introduce new customs and improved methods of cultivation without offending native prejudices; to build roads, bridges, and railways; to render rivers navigable; and to make the country pay its way. The administrative capital is Zungeru, near the centre of Northern Nigeria.

151. The Western Sudan. The Western or French Sudan lies between the Sahara and the Guinea forests. The dry north produces thorny plants, and the chief trade is in gums and salts. In the savana region of summer rains clumps of baobabs stand out among lands or cultivated fields. Millet and cotton are round the villages, and cattle and sheep are gr the Futa Jallon Highlands, in which the Niger The chief town is Timbuktu (§ 113). The Senegal fl west to the Atlantic, and has St. Louis as its port.

Exercises

1. Write a short account of Abyssinia.
2. Describe the occupations of the Egyptian Sudan.
3. Draw a map of the Niger and Northern Nigeria.
4. What are the chief products of Northern Nigeria? Which is likely to be of most value to the Empire?

CHAPTER XIII

THE NIGER AND THE GUINEA COAST

152. The Niger. Find the Niger on the coloured map and trace its course. It rises in the hot wet equatorial belt in the Futa Jallon Highlands, less than 150 miles from the sea. Owing to the slope of the land it flows for 1,000 miles away from the Gulf of Guinea through the savana belt, and reaches the edge of the desert near Timbuktu. It then flows east and south-east across the savanas of Northern Nigeria and the hot wet forests of Southern Nigeria. The Benue is its st tributary, and Lokoja, at the confluence, will e an important place. The Niger forms falls t enters the coastal plain, but is navigable both and below them. It enters the Gulf of Guinea by ow, unhealthy, densely forested delta, in which its distributaries are fringed with mangrove swamps.

153. West African Forests. The Niger forests produce many valuable trees, of which the oil palm is the most important. This tree requires great heat and moisture, and is not found more than 150 miles from the sea. The fruit is not unlike a pine cone, and contains many 'nuts' which look like yellow plums. When these are boiled the grease they contain rises to the top and forms palm oil, which is made into soap. The real nut or kernel is something like a walnut, and contains palm kernels, which yield an inferior oil. The kola is another valuable tree. Rubber grows wild and is also beginning to be cultivated. The plants are tapped in the dry season, which lasts from November to May. Mahogany is one of many beautiful timber trees, and there are many dyewoods.

154. In the forest clearings cotton, indigo, coffee, and other tropical crops are grown. The natives are negroes, who practice cannibalism and many horrible superstitions. The Guinea Coast once supplied many slaves, and in times of famine children are still offered for sale.

155. Railways are only beginning to be built, and there are few roads. Goods are carried by native porters, who march in single file along the narrow forest roads, or by canoes on the many rivers.

156. British Possessions. The British possessions in West Africa are separated from each other by foreign territory. Gambia is entirely surrounded by French possessions. Sierra Leone is cut off from the Gold Coa Colony by Liberia and French West Africa. German Colony of Togoland and the French Prote of Dahomey lie between the Gold Coast and S Nigeria. The coast of all this region is beaten by surf and fringed with mangrove swamps. Inland a dense hot wet forests, intersected by many rivers and creeks. The hot wet climate is very trying to Europeans, especially to Northern Europeans.

157. Gambia. Gambia, which is entered by the fine estuary of the Gambia river, consists of a narrow strip of territory along the banks of the river as far as the foot of the falls by which the river descends to the coastal plain. The colony is the least unhealthy part of West Africa. Large quantities of ground nuts are exported to the soap factories of Marseilles. The capital is Bathurst, with a good harbour.

158. Sierra Leone. Sierra Leone is high in the north, but low, swampy, and unhealthy near the coast. The forests produce rubber, mahogany, ground nuts, and oil palms. Freetown, the capital, with a good harbour, has been made more healthy by draining

swamps and improving the water supply. Many of the Europeans live on the lion-shaped ridge which gave Sierra Leone its name.

159. A West African Market. A visit to a market always gives a traveller a vivid idea of the life of a people. A traveller saw negro women selling a great variety of goods in Freetown market, some of which were native produce and some imported. He mentions pins, needles, and reels of cotton, which have replaced the thorns and fibres once used; all kinds of small hardware, looking-glasses, beads, cowries, strong-smelling pomatum, shea-butter nuts, ornamental feathers, snuff-boxes made of nuts and fitted with quills for inhaling [illegible] snuff, and the skins of leopards and monkeys. [illegible] foods for sale were ground nuts, rice of rather [illegible] quality, ginger, kola nuts, roasted ground-hog on [illegible]s, dried bats and sun-dried fish. The fruits included custard apples, citrons, limes, oranges grown in the mountains, bananas, half-wild pineapples, mangoes, guavas, and alligator pears. The last tastes something like a filbert, and is eaten with pepper and salt. The vegetables were watercress, onions, beans, yams, garlic, tomatoes, sweet potatoes, and others which are unknown in this country. Plantain or banana paste, puddings of sour maize flour, ginger cakes, and lumps of native bread wrapped in banana leaves were also on sale. Another traveller found a thousand people at a market up country. Among the wares were raw cotton, cotton cloth of native make, cotton yarn dyed with indigo, dried indigo and tobacco leaves, palm nuts, palm oil, and palm-kernel oil, iron of native forging, rice, ground-nuts, cooked sweet potatoes, fowls, dried ants, dried rats on skewers, dried fish, native mats and pots, some cattle, sheep, and goats, and a little salt and gunpowder.

160. The Gold Coast Colony. This includes the old negro kingdom of Ashanti. The colony is under 2,000 feet high, densely forested, and unhealthy. In winter the harmattan wind (§ 107) is very bracing, and is often called 'the doctor'. The forests are cut up by many rivers and swamps. In the native clearings banana, yams, and coco-nut palms are grown. The mud houses are roofed with branches or stout fibres. On the coast is Akkra, the capital, and about 150 miles inland is Kumasi, once the capital of Ashanti.

161. Southern Nigeria is also a densely forested region, producing rubber and the best oil palms in West Africa. The capital is Lagos, which commands all t good routes into the interior. A railway has built inland from Lagos, and is continued Zungeru in Northern Nigeria (§ 150).

Exercises

1. Draw a map of West Africa, marking the Gambia and the British possessions. Shade the land over 3,000 feet high.

2. Name some of the causes which make it difficult to reach the interior of West Africa.

3. Name the most important products of the West African forests.

4. Can you suggest why the natives of Northern Nigeria are more civilized than the natives of Southern Nigeria?

CHAPTER XIV

THE CONGO AND ITS FORESTS

162. The Congo Lands. The third great river of Africa is the Congo. Find it on the coloured map, and notice that it does not form a delta like the Niger but enters the sea by an estuary. The German Kamerun Colony, with the high volcanic peak of that name, and French Congo separates Nigeria from the Congo river. Most of the Congo basin forms the Belgian Congo. Angola, south of the Belgian Congo, is Portuguese.

163. The Congo. Trace the course of the Congo ... coloured map. It rises in the highest part of ...e plateau of East Africa, and has to fall several ...d feet before it reaches the sea. The colour of ...ap shows where these falls are most likely to occur. Notice that while the Nile and Niger flow first across forests, next across savanas, and then reach the northern desert, the Congo has its entire course through the hot wet forest belt. Flowing through one of the wettest regions in the world, it receives a very large number of tributaries and carries an immense amount of water to the sea.

164. Find Lake Bangweolo on the map. The streams flowing to this lake form the head-streams of the Congo, which is as large as the Thames at London Bridge when it leaves Lake Bangweolo. It falls rapidly in its course of 100 miles northwards to Lake Mweru (2,100 square miles). After leaving this lake, the Lualaba, a great tributary from the east, carries into the Congo the surplus waters of Lake Tanganyika. The Congo leaves the highest part of the lake plateau by Stanley Falls, a series of rapids and falls which extend for 56 miles.

165. The middle Congo is a very different river. Instead of falling rapidly it flows across an immense level region, which is probably the dried-up bed of a vast lake or great inland sea. This is covered with dense hot wet forests, through which innumerable rivers flow to the Congo. Many of these (e.g. the Ubangi) are themselves immense rivers. The Congo sometimes breaks up into many channels, and sometimes flows as a noble river many miles broad. Its lake-like waters are studded with densely forested islands and swarm with fish. The hippopotamus and the crocodile haunt its waters and banks. After about 1,000 miles the Congo widens out to Stanley Pool, where it is st[illegible] 1,000 feet above the sea. Here it ceases to be [illegible] able, and begins its final rush down the steep [illegible] of the plateau to the sea.

166. Stanley, the famous explorer of the Cong[illegible] describes this descent: "It first precipitates itself with awful force down a five-mile slope, a succession of leaping waves, which from crest to crest might be about 300 feet apart. Then by a series of mad rapids, separated by short stretches of swift but steady flows, for 75 miles, all of it confined by the towering rock barriers of a gorge from 300 to 600 feet below the level of the cleft land. Then for 88 miles it is tolerably safe to navigation, followed by another 60 miles rush of a distracted river, with roaring cataracts alternating with noisy rapids, through the rocky heart of the hills, until finally the last plunge has been made down the Yellala Falls."

167. The 110 miles which the Congo has still to flow before reaching the sea are across the low unhealthy coastal plain. Its port is Matadi, at the head of the estuary, which is connected by rail with Leopoldville on Stanley Pool.

168. Climate of the Congo. The Congo lands have a hot wet equatorial climate, with two wetter and two drier seasons. The southern part of the Congo basin has least rain when the Sun is overhead at the northern tropic, and the northern part has least when the Sun is vertical over the southern tropic. Even in the drier months dense mists are common, and the hot moist climate is very dangerous to Europeans.

169. The Congo Forest. Rubber is more abundant in the Congo forest than anywhere else in the world. Teak, ebony, mahogany, and oil palms are also very numerous. Stanley writes of this forest: " Look at the ..rious palms crowding on each other. Their fibres ..ake the stoutest hawsers, the strength of which ... hemp, Manilla fibre, nor jute can match. See ..ft pale green moss draping the tree tops like a ... That is the orchilla weed, from which a valuable dye is extracted. The endless lengths of calamus are useful for flooring and verandahs, for sun screens on river voyages, for temporary shelters on open river terraces frequented by fishermen, for fish nets and traps, for field baskets, market hampers, and a host of other useful articles, but especially for the construction of neat strong houses and fancy lattice work. That pale white blossom is the rubber plant. There is a ficus (fig) with fleshy green leaves. Its bark is good for cloth, and its soft spongy fibre for making paper."

170. Peoples of the Congo. Many different tribes live along the Congo and its tributaries. They practise many arts and industries, and are good tillers of the ground, blacksmiths, potters, &c. They build great canoes, rowed by large numbers of rowers, and are skilful boatmen and fishermen. In spite of this they practise cannibalism and horrible forms of religion.

171. The Pygmies. Most of the Congo tribes, whether cannibals or not, are fine well-grown people. It is very different with the dwarf pygmies whom Stanley found in the depths of the great forest. The pygmies are wandering hunters, who never remain long in one place. They have no settled homes, but build shelters in the forest where they happen to find themselves. They use little bows and arrows, which are sometimes poisoned, and are so small that they easily find cover. They kill a great beast like the elephant by shooting at the eyes, and then overwhelm the blinded giant with showers of tiny arrows. They are also clever fishermen. They know nothing of religion or family relationships, they have no games, the nearly naked, and have no ornaments of any kind last is very unusual among uncivilized peop delight in decorating their persons. They do n the ground, but when they want bananas or other vegetable food they go to some village clearing and barter meat in exchange. They have enormous appetites for their size, and a tiny pygmy can eat sixty bananas at a meal.

172. Angola. Angola has a coastline of over 1,000 miles on the Atlantic Ocean. The higher interior is much healthier than the coastal lowlands. The rainy season lasts from October to April, the summer of the southern hemisphere, and during it violent thunderstorms are common. The country is partly forest and partly savana. The oil palm grows near the coast, and the baobab up to a height of 3,500 feet. To the south Angola becomes drier and passes through scrub into desert. Loanda, the capital, is the centre of a coffee-growing district, and palm oil and rubber are also exported.

Exercises

1. Draw a map of the Congo and its tributaries, shading land over 3,000 feet high.

2. Describe the Congo forest and its products.

3. What do you know of the Pygmies? Can you explain their backward condition?

4. Is the Congo a good route to the interior? Explain your answer fully.

CHAPTER XV

EAST AFRICA AND UGANDA

173. East Africa. East Africa is a high plateau which rises to over 8,000 feet. It is crossed by two deep rift valleys containing long narrow lakes, the western one drained to the Nile and Congo. Above the rift valleys rise dead and dying volcanoes. Find on the map Ruwenzori (16,000 feet), Kilimanjaro (17,000 feet), Kenya (19,000 feet), and the volcanoes round Lake Kivu, nearly 700 miles from the sea.

174. Climate and Products. East Africa is crossed by the equator, and would be the hottest part of Africa if it were not also the highest part. The lowlands are densely forested, but the high plateau has forests only in the valleys. The rest is savana land. The mountains have a series of plant belts varying with the height. Above the tropical forests of their lower slopes are tree ferns and bamboos, with grasslands above. Many native tribes in the savanas keep cattle and live chiefly on milk, but others till the ground and grow

bananas and various food plants. The tse-tse fly is one of the scourges of the country. Its bite is fatal to cattle, and men bitten by it often contract the incurable disease of sleeping sickness. The white ant destroys everything not made of metal. All through tropical Africa its ant-hills rise to twice the height of a man.

175. The Uganda Railway. A line has been built from Mombasa, on an island off the east coast, to Port Florence on Lake Victoria, a distance of about 600 miles. The builders had to face many difficulties, among which were the great height of the country and the great depth of the rift valley, the danger to life from wild animals and disease, and the injury done to the line by tropical rains which washed whole sections away, and white ants which devoured everything nee to construct it.

176. Mombasa, on a richly forested island, is a pi turesque place, with a long history. The old Arab-Portuguese town, with its fort crowning the coral cliffs, the modern English quarter, and the thatched native huts, are set among palms framed by a background of deep blue sea. The railway line crosses to the mainland, and is carried across the unhealthy forested lowlands. It then climbs the face or escarpment of the plateau, and for about 50 miles passes through a region of porous rock, thinly covered with thorny scrub. Beyond this it reaches the rolling grassy plains of Masailand. The Masai are one of the finest and handsomest of the negro races of Africa, who keep immense herds of cattle on the savanas, and, like all herdsmen, lead a wandering life. War used to be their delight and sport, and their picked warriors were famed for their courage. Masailand is a fine game country, and antelopes, rhinoceroses, elephants, and even lions may be seen from the train. Nairobi, the capital



Photograph lent by Sir Frederick Treves, Bt

Fig 28 MOMBASA

Notice the tropical palms



Photograph lent by Sir Frederick Treves, Bt

Fig 29. THE SOURCE OF THE NILE

This shows the high savannah country of Central Africa.

of the East African Protectorate, is at present a town of corrugated iron houses, which are neither so picturesque nor so cool as the thatched native houses. From this part of the line on a clear day travellers catch a glimpse of the cone of Kenya, many miles away in German territory. A growing number of white settlers are devoting themselves to agriculture. Coffee does well, but the country is too high for cotton.

177. The train climbs to a height of over 7,000 feet, and reaches the edge of the rift valley. This is seen lying far below, and 40 miles away on the other side is the high edge of the plateau which shuts it in on the west. The train descends the forested precipices of the steep escarpment to Lake Naivasha. It crosses the broad valley and then climbs up the steep forested fa of the western escarpment. At last, at a height of o 8,000 feet, it comes out on a rolling grassland which stretches away as far as eye can see. The line descends gradually across savanas, pinewoods, heather moors, tropical forests, and clearings planted with bananas, to Port Florence on Lake Victoria.

178. The Banana in Uganda. The banana is the staff of life among the natives of Uganda. They gather it unripe and steam it in earthen pots covered with its own leaves. Sometimes it is roasted and crushed into meal. The fibres are made into baskets, string, wicker-work, &c., and the leaves take the place of tablecloths. The juice makes a kind of soap, and a pleasant drink is made from the fruit. Fish are caught in the lake, and meat is eaten whenever it can be had. The people formerly dressed in bark cloth which was made by beating wood-pulp thin, but now they are eager for European clothes. They are fond of ornaments, and one traveller saw a man of fashion wearing a huge empty meat-

extract jar as an earring. Many arts are carried on, and boat-building is one of the most important. The largest canoes will hold a thousand persons. No nails are used in these boats, which are sewn or bound together. The different tribes devote themselves to different occupations. The Baganda till the ground, but the Bahima keep cattle and live chiefly on milk. The two look down on each other and seldom intermarry.

179. Uganda. Uganda is unhealthy in the lower forested parts, but healthy above 5,000 feet. Steamers run on the lake. All vegetation is cleared away round the landing places, for it serves as a breeding-place for tse-tse flies and mosquitoes. The capital is Entebbe.

180. German East Africa. German East Africa resembles British East Africa, but is less fertile. The largest town is Dar-es-Salaam, with a fine harbour.

181. Zanzibar, on a coral island, and Pemba are British. Zanzibar was formerly a centre of Arab power and of the Arab slave trade. Cloves are exported.

Exercises

1. Why is East Africa less densely forested than the Congo basin? Explain fully.

2. Draw a map of the Uganda railway, shading land over 3,000 feet.

3. What are the chief drawbacks to the colonization of East Africa and Uganda by white men?

CHAPTER XVI

THE ZAMBEZI

182. The Zambezi. On the coloured map find the Zambezi, the only large African river flowing east, and trace its course. It enters the sea by a large swampy mangrove-covered delta ; but sediment brought down by the river has choked the mouths of most of the distributaries and the river is difficult to enter.

183. The Shire. In the middle of last century Dr. Livingstone, the famous missionary traveller, made his way through the delta, and at its head, about 100 miles from the sea, he found a great river flowing into the Zambezi from the north. Find this on the coloured map. It is the Shire, which flows out of Lake Nyasa, the southernmost of the long narrow rift-valley lakes. Dr. Livingstone traced its course and found that it was navigable for over 150 miles. Then, like all African rivers, it was interrupted by rapids and falls in the course of its headlong descent from the high interior to the sea. These falls interrupt navigation for 50 or 60 miles, but above this the Shire again becomes navigable.

184. The Shire Highlands west of the river are one of the healthiest parts of tropical Africa. The climate is tropical, with wet summers and dry winters. Several hundred Europeans have settled there, many of whom are Scotsmen. They grow coffee of the finest quality, tea, cacao, and other tropical plants, and wheat in the cooler parts. The chief town is Blantyre. A railway has been built to connect the navigable reaches of the Shire above and below the falls, and steamers run on Lake Nyasa.



By permission of the Royal Geographical Society.

Fig. 30. Lake Nyasa.



By permission of the Royal Geographical Society.

Fig. 31. In the Shire Highlands.

185. Nyasaland. The high plateau between Lakes Nyasa and Tanganyika forms Nyasaland. The highest summits rise to 10,000 feet. Nyasaland is a healthy region. The rainy season is from December to March, in the southern summer. The land is then covered with streams, rivers, pools, and swamps, and roads are impassable. This is true of all parts of tropical Africa at the end of the rainy season. The grass in the savanas grows to a great height, and makes good cover for large game. Showers fall occasionally during April, May, and June, when the dry season begins. The rivers sink, the grass dries up, and the country becomes dull and brown. In the dry season the grass is burned off, but springs up again fresh and green after the first rains. In the higher savanas the baobab is the chief tree, but there are many species in the forests which cover the lowlands.

186. The native tribes of Nyasaland are much more civilized than those of the Niger or Congo forests. No doubt this is partly because the climate is healthier and the forest less dense. The land is cleared and worked by the men, and the crops are weeded and gathered by the women. Men also work iron, make clothes, and plait dry fibres of grass into watertight baskets and utensils. Clay pots, on the other hand, are always made by women. Grain is the staple food. It is pounded into flour and eaten with fish, meat, white ants, pepper, or some other relish. In some parts it is made into beer. Round Lake Tanganyika a kind of beer-gruel is the commonest food.

187. Nyasaland has many white settlers, who grow rubber, tobacco, cotton, and other tropical crops. Most of the transport is still done by native porters, but the country is so rich in minerals that it will soon be opened up by railways. The administrative capital is Zumbo.



Fig. 32. The Zambezi Falls

Photograph by Wilson Bros.

188. The Course of the Zambezi. Find the head-streams of the Zambezi in the coloured map, and notice how near they are to the head-streams of the Congo. The colouring of the map shows what kind of course we may expect the Zambezi to have. It lies too far south to flow through a densely forested basin like the Congo; but there is a well-marked wet and dry season, to which plants must adapt themselves. We may expect that in its upper course it will pass through large savanas, where cattle-keeping will be important. We see, too, from the map that the river must form a number of falls in its descent to the sea. What we could not have expected from the map is that among these are the most magnificent falls in the world.

189. The Victoria Falls. The Victoria Falls were discovered by Dr. Livingstone in 1851. Above the falls the Zambezi is a magnificent river nearly a mile wide from shore to shore. At the falls it flings itself over a shelf of rock half a mile wide, and falls sheer for 450 feet into a deep narrow gorge shut in by high rock walls, in which its waters hiss and boil in terrible beauty. The roar of the water can be heard and the column of spray can be seen for many miles, and the natives give the falls the beautiful name of the Falls of the Sounding Smoke. The constant spray makes the forests on both sides of the river very luxuriant. The line which is being built from the Cape to Cairo is carried across the Zambezi on a fine bridge below the falls.

190. Below the Victoria Falls the river is again broken by rapids, and often flows in wild defiles and gorges. At other points its banks are low and it floods its banks after the rains. About 350 miles from the sea it forms a last series of falls and descends to the coastal plain, where it forms a great delta.

191. Political Divisions. The Zambezi forms the boundary between Northern and Southern Rhodesia, and between Central and South Africa. Northern Rhodesia is still little known or settled by white men. Much of the country is high, open, and healthy, and well suited for farming and stock-raising. Its mineral wealth is very great, and includes coal, copper, and gold. Wheat, coffee, cotton, and the crops which do well in similar regions are being introduced.

192. Portuguese East Africa has a coastline of about 1,400 miles and the fine harbour of Delagoa Bay. The Zambezi delta divides it into two nearly equal parts. The coastal plains are swampy and unhealthy, but the interior rises to nearly 9,000 feet. The forest products are important. The chief town is Lourenço Marques, on Delagoa Bay. Beira, also on the coast, is connected with the Rhodesian railway lines.

Exercises

1. Draw a map of the Zambezi and its tributaries, and shade the land over 3,000 feet.

2. Compare the course of the Shire and the Zambezi.

3. Describe the different plant-belts of the Zambezi, and the occupations of each.

4. Explain why the rainy season in Nyasaland is from December to March.

5. On any map mark Blantyre, Zumbo, the Cape-to-Cairo line, Beira, and Delagoa Bay and the lines connecting it with the Cape-to-Cairo line. Use any books or atlases.

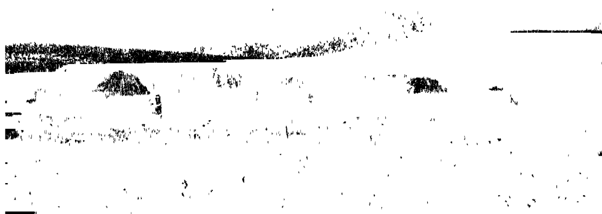
CHAPTER XVII

SOUTH AFRICA

193. South Africa. South of the Zambezi is the high plateau of South Africa, rising by steep terraces from a narrow coastal plain, which is nowhere over 50 miles broad. From below, the high edges of these terraces look like mountain ranges and have different names. They are highest in Natal, where they form the Drakensberg Mountains. A traveller from the coast who wishes to reach the interior must take a railway which climbs steeply from terrace to terrace till it comes out on the rolling veld, a steppe land broken by flat-topped kopjes (pronounced koppies) of harder rock.

194. Climate. South Africa is almost in the latitude of North Africa, and is a dry region. If the continent were broader South Africa would be a desert like the Sahara. As it is, the Kalahari desert is comparatively small.

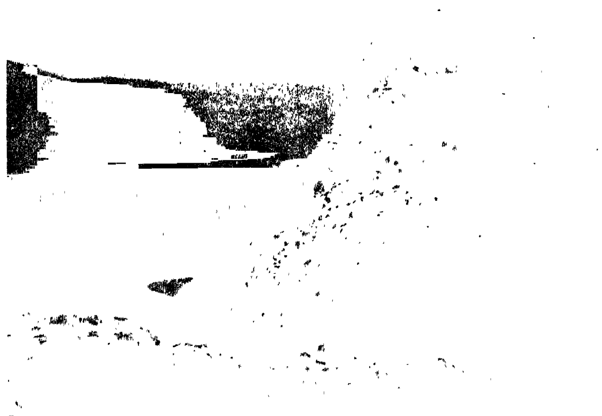
195. There is a marked difference between the climate of east and west. The east is much warmer than the west at sea-level. This is due to a cause which has not been mentioned before. The surface waters of the sea, which are greatly heated near the equator, become lighter and flow south as the Mozambique current along the east coast of Africa. They warm the winds which blow over them and make the east coast of Africa warmer than it would otherwise be. This southward set of warm surface water is balanced by an up-welling of cold water nearer the pole, and a cold current flows north along the west coast of South Africa, chilling the winds which blow inland over it. Remember, then, that the ocean, like the air, has a circulation of its own, though it



Photograph by Wilson Bros.

Fig. 33. Majuba.

Majuba is a flat-topped hill in the Drakensberg on the frontier of Natal and the Transvaal. It is shown in the background. Notice the native kraals and mealie fields in the foreground.



Photograph by Wilson Bros.

Fig. 34. View over the Veld from the Summit of Majuba.

This gives an excellent idea of the rolling veld of Natal. The Transvaal veld is much flatter.

cannot be explained here. The Mozambique current makes the coastal plains of Natal warm enough to grow tropical crops.

196. The east is also wetter than the west. The south-east trade winds strike the high eastern edge of the Drakensberg Mountains and drop their moisture as rain. They pass on to the interior and west as dry winds.

197. Most of South Africa has rain during the hot months, from October to March. These months are almost rainless at Cape Town, to which the westerly winds bring winter rains as in Northern Africa. Olives, vines, oranges, and other Mediterranean fruits are grown round Cape Town.

198. South African Rivers. South Africa is too dry for great rivers like those of tropical Africa. The Orange, the longest (1,200 miles), carries little water to the sea. Both the Orange and the Vaal, its longest tributary, rise in the Drakensberg, and flow west across a dry region. The watercourses which open to them seldom contain water except after storms. All South African rivers come down in flood after rain, for the water runs off the sun-baked ground to the nearest watercourse instead of sinking through the soil. The flooded streams tear away their beds and deepen their valleys very quickly. Such valleys hinder rather than help communication. In flood they cannot be crossed by the fords or 'drifts', and when dry they involve a steep descent and ascent.

199. As the Orange flows west through the dry region it loses much water by evaporation and shrinks in size as it nears the sea. It leaves the high plateau by a deep gorge, forming falls as it descends. The Limpopo, which flows first north and then east, rises in

the Witwatersrand, and carries little water. In parts it is a mere string of pools in the dry season, infested by crocodiles. It forms falls as it descends to the coastal plains of Portugese East Africa. One of its tributaries is the Oliphant or Elephant river.

200. South African Plants. South Africa is too dry for trees except on the hot wet coastal plain of Natal and in the valleys of the tropical south. The Australian eucalyptus, with a small, long, narrow leathery leaf, is planted round many farms in the less healthy parts. Nearly all South Africa is a steppe or veld, passing into scrub or desert in the drier west and into savana in the north. The sweet veld produces good grasses all the year round, but the sour veld only in spring. Farmers burn off the dry grass at the end of the dry season. This produces fresh green grass after the rains but keeps down trees. The poorer scrubs are called karroos, from a native word meaning a bare dry place. All the karroo plants are thorny, and the wait-a-bit thorn is hated by travellers. Still drier is the Kalahari desert, where men and animals quench their thirst on the fleshy water-storing melons which grow wild. The natives also find water in the roots of many plants. The South African flowers are very beautiful. Heaths are very common and bulbs do well. Large tracts are covered with wild arum lilies, which are called 'pig lilies'.

201. Many tropical plants are grown on the coastal plains of Natal, and in the lower valleys and plains of the north. Mediterranean fruits grow round Cape Town, where the vineyards yield more to the acre than anywhere else in the world. Maize, always called 'mealies', and Kaffir corn, or millet, which we know as bird-seed, are grown on the plateau.

202. South African Animals. South Africa was once densely stocked with game, but this has been destroyed by the white man in the last century. Lions and elephants are seldom seen, though the leopard, or 'tiger', is not uncommon. Jackals are kept from the stock by jackal-proof fences. Sheep are the great wealth of the country. Horses are subject to horse-sickness. Those which recover are said to be seasoned or 'salted'. Cattle plague and the tse-tse fly have cut down the number of cattle. The tse-tse fly prefers the blood of wild animals and is becoming scarcer as game is killed off. Oxen are used to draw waggons on 'trek', but this mode of travelling is slow and costly. Ostrich farming pays well. The locust and the white ant are both very destructive.

203. People. The white English and Dutch settlers are now united in the South African Union. The English are farmers, engineers, mineowners, and traders. The Dutch Boers are a pastoral people, simple in their habits, indifferent to comfort, and at home in the saddle or with the gun. The finest native races are the Kaffirs and Zulus, who are agricultural and pastoral people. They live in villages of 'kraals' or thatched huts, and their women cultivate 'mealies'. The Hottentots, who keep more sheep than cattle, lead a wandering life. The Bushmen are a dwarf people, perhaps related to the Pygmies (§ 171). They hunt game with poisoned arrows, eat frogs, lizards, tortoises, and any kind of animal food, and dig for edible and water-bearing roots. They are very clever at drawing, and their rock-paintings are much admired. The natives everywhere greatly outnumber the whites.

204. Political Divisions. The Union of South Africa includes Cape Colony and Natal on the east coast,

and the Orange Free State and the Transvaal in the interior. The poorer, drier interior forms Southern Rhodesia, which includes Bechuanaland, Matabeleland, and Mashonaland.

205. West of British South Africa is the dry region of German South-west Africa. Walfisch, or Whale Bay, the best harbour, is British.

206. The Cape to Cairo Line. This climbs the difficult terraces of the plateau to the karroos and runs across Cape of Good Hope, by Kimberley to Mafeking. From there it goes north by Buluwayo, the Wankie coal-fields, the Victoria Falls, and the mining district of Broken Hill into the Congo Free State. Branch lines go to the coast (i) through Johannesburg and the coalfields of the Transvaal and Natal to Durban; and (ii) through Johannesburg and Pretoria to Delagoa Bay. North of Buluwayo a line goes by Salisbury, the capital of Rhodesia, to Beira (§ 192).

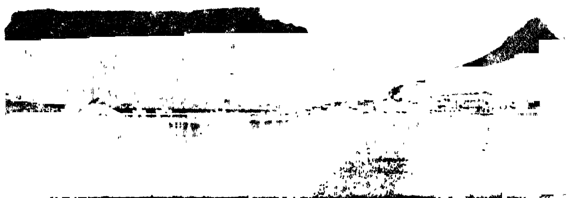
207. Cape Colony. Cape Colony is about twice the size of the United Kingdom. It has a long coastline, which extends from the Orange River to Natal, but has few good harbours. Find on the map the ports of Cape Town, Port Elizabeth, and East London. The two last are exposed to the force of the south-east gales, and ships have to lie off shore and land their passengers by tugs. The coastal plain is narrow and the interior rises very abruptly. This made it difficult for settlement to spread inland.

208. Cape Town is finely situated on a magnificent bay at the foot of Table Mountain (3,600 feet), which falls by lofty sandstone precipices to the woods below. There are many beautiful ravines or kloofs (English 'clefts'), which contain exquisite flowers. Cape Town has Houses of Parliament, an observatory and a university,

and is one of the capitals of South Africa. To the north is the Dutch-looking town of Paarl, and the famous vineyards of Constantia. Kimberley, near the borders of the Orange Free State, is the great diamond town of South Africa. In the east the chief inland town is Grahamstown, with a university.

209. Sheep-farming is an important industry in Cape Colony, and the merino sheep does well. The wool does not fetch so high a price as Australian wool, because it is less carefully sorted. This is due to the scarcity of labour, for where coloured men are employed white men will not do work which they think menial. Angora goats supply mohair, which is made into rugs. Cattle are kept, but give little milk in a dry climate, and goats' milk is commonly used. Hides are exported from Port Elizabeth for tanning into leather. Ostrich-farming is also very important.

210. Natal. Natal rises from a hot wet coastal plain, with a tropical climate, to the highest ranges of the Drakensberg. Here the Tugela river flings itself down by a sheer fall of 1,800 feet. The highest points are Champagne Castle (12,000 feet), and Mont aux Sources, where many streams rise (11,000 feet). Majuba, famous in history, is about 7,000 feet high. The rivers are too swift to be navigable, and the roads are almost impassable after rains. On the coastal plain grow palms, mangroves, bananas, bamboos, coffee (the national drink of South Africa), rice, cotton, ginger, sugar, pineapples, tobacco, and many other tropical crops. Thousands of Indian coolie labourers work in the plantations. Sheep and cattle are grazed in the higher parts. There are coalfields in the north round Newcastle and Dundee. The capital is Pietermaritzburg, and the chief port is Durban.



Photograph by Wilson Bro

Fig. 35. Cape Town and Table Mountain.



Photograph by Wilson Bros.

Fig. 36. A River in Natal.

This shows how all African rivers descend from the high plateau to the coastal plain.

211. The Orange Free State. The Orange Free State is as large as England, but contains only as many people as a second-rate English town. It is a dry region, well suited for sheep- and cattle-breeding. The best part is on the borders of Basutoland, 'the Switzerland of South Africa'. All the towns, and even Bloemfontein the capital, are small.

212. The Transvaal. The Transvaal, or land beyond the Vaal, is a high tableland west of the Drakensberg. It consists of the high veld, over 4,000 feet high, the middle veld, and the low bush veld. The bare, healthy, high veld pastures sheep, and the middle veld suits cattle and maize. The better-watered bush veld is unhealthy and ravaged by fever and the tse-tse fly. Coffee, sugar, tobacco, and other tropical crops are grown in the lowlands.

213. The Transvaal towns are all small. Pretoria, the capital, is on the high veld. The only large town is Johannesburg, at the foot of the Witwatersrand, one of the richest gold-mining districts in the world. Johannesburg, with a population of nearly a quarter of a million, lies in a bare, scorched, windy country, where water is scarce and sand-storms are common. Coal is found at Vereeniging in the Southern Transvaal, and elsewhere.

214. Rhodesia. From Mafeking the continental line runs across the dry region of Bechuanaland, where the high hills of the white ant are commoner than signs of human life. Much of Bechuanaland consists of the uninhabited Kalahari desert, the home of a few wandering natives. In Matabeleland is Buluwayo, at the foot of the picturesque Matoppo Hills, the burial-place of Cecil Rhodes, the founder of Rhodesia. In Mashonaland is Salisbury, the capital.

215. Notice that Buluwayo is very nearly on the Tropic of Cancer, so that except at a considerable height Rhodesia is not very suitable for white men. Fortunately, much of it is over 5,000 feet high. The dryness of the extreme south gives place in the north to a tropical climate with alternate wet and dry seasons. The soil is fertile, and much of the land makes fine pasture. Sheep, cattle, horses, and pigs do well. The natives grow pumpkins, mealies, Kaffir corn which they make into porridge and beer (§ 186); and rice does well in the lower swampy districts. White settlers grow wheat, barley, oats, maize, and an immense variety of delicious fruits. In the lower hotter parts coffee, cotton, and tobacco are grown. The whole of Rhodesia is rich in gold, coal, and other minerals, but labour is scarce.

Exercises

1. Draw a map of South Africa, marking the Orange, Vaal, and Limpopo rivers, Bloemfontein, Buluwayo, Cape Town, Durban, Johannesburg, Kimberley, Mafeking, Pietermaritzburg, Port Elizabeth, Pretoria, Salisbury.

2. Explain fully why the east of South Africa is hotter and wetter than the west.

3. With what parts of Northern Africa would you compare South Africa? Give your reasons fully.

4. Describe fully the South African veld.

5. Write short accounts of the life of (*a*) the English settlers in Johannesburg, (*b*) the Boer farmers, (*c*) the Kaffirs, and (*d*) the Bushmen. Explain any differences.

6. Write short accounts of (*a*) South-west Cape Colony, (*b*) Natal, (*c*) the Transvaal, showing how the difference of climate affects them. Compare them with those parts of Africa which seem to you to be most like them.

CHAPTER XVIII

SOME AFRICAN ISLANDS

216. The Atlantic Islands. The globe shows that several groups of small islands lie in the Atlantic Ocean off the north-west coast of Africa. Find the Azores (Portuguese), more than 1,000 miles west of Portugal; Madeira (Portuguese), and the Canary Islands (Spanish), between the Azores and the African coast; and the Cape Verde Islands (Portuguese), due west of Cape Verde. All are picturesque, mountainous, volcanic islands, with a warm equable climate and a rich vegetation. The highest point is the Peak of Teneriffe in the Canaries, which is over 12,000 feet. Bananas, sugar, vines, and tropical fruits are grown, and Madeira and the Canaries produce good wines. The chief towns are Funchal in Madeira, and Las Palmas in Grand Canary, both ports of call for South African liners.

217. Islands in the Indian Ocean. Find Madagascar (French), in the Indian Ocean. It is one of the largest islands in the world, and more than twice the size of France. The east coast, which rises steeply from the sea, receives much rain from the trade winds, and is densely forested. The centre is a high plateau, forming a savana, like Rhodesia in the same latitudes. The west coast is lower and drier. Madagascar produces all tropical plants and exports rubber. The capital is Antananarivo, on the plateau. Réunion (French) and Mauritius (British) are volcanic islands east of Madagascar. They have a hot wet climate and are covered with tropical forest. Sugar is grown in the clearings.

CHAPTER XIX

AUSTRALIA AND NEW ZEALAND

218. Australia. Australia (3,000,000 square miles) is the smallest of the continents. The other two southern continents, Africa and South America, are much alike in shape, for both are broad in the north and very narrow in the south. At first sight Australia is very unlike them, but compare its shape with that of Africa north of the Gulf of Guinea and Cape Guardafui. If you make a tracing of both and put one over another you will see that they are not very unlike after all. Both are broad compact land masses, with regular unbroken coasts. Their position is also very similar. The coast of Northern Africa is roughly in lat. 37° N. and the Guinea coast in lat. 5° N. The northernmost point of Australia is very nearly 10° S. lat., and the southernmost point about 39° S. Thus, North Africa and Australia are alike both in general shape and in latitude. The chief difference is that one is north and the other south of the Equator, so that one has its summer while the other has its winter. The height of both is also very much the same, as the coloured maps show. With so many important resemblances we should expect Australia to resemble North Africa in many other ways. The interior of North Africa is a desert, partly because of its latitude and partly because of its great distance from the sea. We should expect to find a great desert in the centre of Australia for the same reasons. The southern part of North Africa lies between the tropics, and has a tropical climate with hot wet summers and warm dry winters. We should expect the same thing

in North Australia, which lies in almost the same latitudes. No part of Australia is so near the Equator as the Guinea Coast, and the hot wet forests will be smaller than in Africa. The North African coast has a Mediterranean climate, with cool winters and winter rains. We should expect a similar Mediterranean region with winter rains in the same latitudes of the south coast of Australia.

219. Now compare Australia with South Africa. The parallel 10° S. lat. cuts the northern end of Lake Nyasa, and the most southerly point of South Africa is about lat. 35° S. Australia and South Africa differ very little in latitude, and as both lie south of the Equator their winters and summers fall in the same months. There is, however, a marked difference, both in shape and in height. Australia is very broad from east to west, while South Africa is narrow. Secondly, South Africa is much higher, and likely therefore to have more rain, especially in the high east. Allowing for these differences, the climate and vegetation of Australia are like those of South Africa. The tropical lands of Angola, Portuguese East Africa, and Natal, the deserts of German South-west Africa and Bechuanaland, and the Mediterranean region round Cape Town are all represented in Australia. These resemblances we can explain by natural laws. The fact that both South Africa and Australia are rich in gold is a resemblance for which it is harder to account.

220. A Contrast. There is one striking contrast between Australia and South Africa. Australia is drier, and freer from fever and other diseases. This fits it to be a white man's country. All through Africa, south of the Sahara, the whites are a mere handful among millions of blacks. In Australia the natives are now

a handful in comparison with the whites, most of whom are of British origin. Slavery and forced labour have been used in Africa so long that white men think it degrading to do any work formerly done by slaves. The Australians do not believe in coloured labour, and though Pacific Islanders were once employed on the tropical plantations of Queensland the custom is ceasing. The Japanese and Chinese, who carry on laundries, market-gardening, and other trades, are also discouraged as settlers. Tropical Australia is developing more slowly than it would do with coloured labour, but there is much to be said for the Australian view.

221. New Guinea. New Guinea is a large island north of Australia. The strait between them is called Torres Strait. New Guinea is divided between Britain, Germany, and Holland. The interior is mountainous, forested, and little explored. The pearl fisheries of Torres Strait are important.

Exercises

1. Draw a map of Australia, shading the land over 1,500 feet.

2. Draw the maps of Australia and Africa described in § 219.

3. How far do you think that Australia can be compared with Africa in latitude, climate, and physical features?

4. Which parts of Australia would you expect to be most thickly peopled, and why?

5. What occupations would you expect to pay best in Australia, and why?

6. If you have any relatives in Australia write a letter from one of them, describing his home and work.

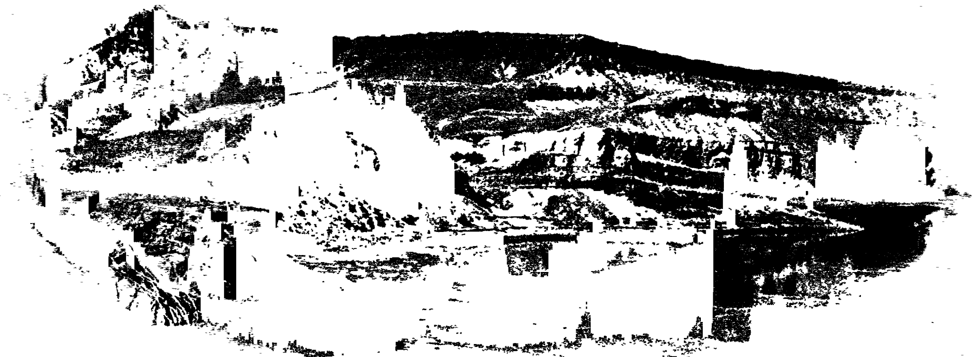
CHAPTER XX

NATURAL REGIONS OF AUSTRALIA

222. Political Divisions. Australia is divided politically into Queensland, New South Wales, and Victoria on the east, South Australia and West Australia. These are united with the island colony of Tasmania to form the Commonwealth of Australia. New South Wales is the oldest colony. Botany Bay was settled in 1788, and Sydney on Port Jackson soon after.

223. Natural Divisions. Look at the coloured map and see where the highest and lowest land are found. The coastal plains are narrow, and the only large areas of land under 600 feet is in the basin of the Murray-Darling and round Lake Eyre. The land over 3,000 feet is nearly all along the east coast. This reminds us of the position of the highest land in South Africa; but the Drakensberg Mountains are 4,000 feet higher than the highest land in Eastern Australia. In both countries the eastern heights lie in the track of the prevailing winds and receive most of the rain, so that the interior is drier than it would be if the east were lower. Three-quarters of Australia is between 600 and 1,500 feet high. The natural divisions are: (i) the Eastern Highlands, (ii) the Central Lowlands, and (iii) the Western Tableland.

224. The Eastern Highlands. The eastern coastal plain, which was settled first, is very narrow. Behind it rises what looks like a range of high mountains, but is the edge of a high plateau. The rivers have cut out deep valleys in the plateau, and covered the coastal



By permission of the South Australian Government.

Fig. 37. THE MURRAY RIVER IN SOUTH AUSTRALIA.

Notice the scarcity of trees in this dry region. The cliffs are quite bare, but trees grow at the water's edge. Notice, too, how well the arrangement of rock layers is seen where rivers cut gorges in dry regions.

plain with alluvial soil. The western slopes are less cut up by river action, except in the south, where the tributaries of the Murray-Darling flow in deep wild gorges to the Central Lowlands.

225. The Eastern Highlands form the Queensland Highlands, the New South Wales Highlands, and the Victoria Highlands, and have many local names. The New South Wales Highlands behind Sydney are called the Blue Mountains, from their colour on the sky line. The coastal plain round Sydney was soon occupied, and explorers began to seek a way across the Blue Mountains. Valley after valley was followed, but no good passes were found. The valleys grew deeper and deeper, and the heads were shut in by huge precipices, down which the rivers fell as waterfalls. These gorges are cut so deeply into the plateau that the railways which run from south to north are carried along the highest part of the Eastern Highlands, west of the end of these great valleys. The highest part of the Eastern Highlands is Mount Kosciusko (7,000 feet) in New South Wales, 10 miles from the frontier of Victoria. Here the Murray rises in the wild gorge known as the Gates of the Murray.

226. The Queensland Highlands are equally rugged along their eastern margin, but they slope more gently to the west. They reach 5,500 feet in the Bellenden Ker Mountains, south of Cape York Peninsula. South of this they are about 300 miles wide from east to west. The rivers which flow east are short, swift, and very liable to floods. Many flow to good harbours. Their upper tributaries often enter them at right angles, through valleys cut out along lines of softer rock. Find the Burdekin, the Fitzroy River, and the Dawson River, in a rich coal district. In New South Wales find the Hunter River, which also flows through a coalfield.



Photograph by Wilson Bros.

Fig. 38. In the Blue Mountains.

This shows why it was so difficult to find routes up the valleys, which are all shut in by high cliffs.

227. In the south of New South Wales and Victoria the Eastern Highlands are called the Australian Alps, and Kosciusko and other high points are often covered with snow. The highest part of the Victoria Highlands is over 6,000 feet high. The eastern slopes are drained by short rivers, and the western slopes by tributaries of the Murray.

228. The Eastern Highlands are rich in minerals. The most valuable is gold, which is found throughout their length. Copper and coal are also abundant.

229. The Central Lowlands. The Central Lowlands lie west of the Eastern Highlands, and stretch from the Gulf of Carpentaria to the south coast. The Gulf of Carpentaria is a submerged part of this lowland. Notice the broad coastal plain which surrounds it. The land rises to the south and sinks again to the stony plains round Lake Eyre, and to the plains of the Murray-Darling.

230. The Artesian Area. The region between the Gulf of Carpentaria and the Murrumbidgee is sometimes called the artesian area. It is about 1,200 miles from north to south and 300 miles from east to west. It consists of sandstone, through which water passes easily. There are great stores of underground water, which can be reached by sinking deep wells. The deepest is over 5,000 feet deep. So great is the pressure on the imprisoned water that when released it rises to the surface and forms a flowing well. Compare this with the Sahara (ch. ix). The water contains many minerals, and is used for watering stock between South Australia and Queensland, along the Great Stock Route.

231. The **Lake Eyre Region** forms a basin of inland drainage, with no outlet to the sea. Compare Lake Chad in the Sudan. The shores of the lake are about



By permission of the South Australian Government.

Fig. 39. A FERTILE VALLEY IN SOUTH AUSTRALIA.



By permission of the Royal Colonial Institute.

Fig. 40. AN ARTESIAN WELL.

Notice how the water is forced up and flows away across the scrub land.

40 feet below sea-level, but it was once a great fresh-water lake, drained to Spencer Gulf. Its size has been reduced by the great evaporation under the hot cloudless sky, and by the sediment carried into it by rivers from the western slopes of the Queensland Highlands. The Barcoo, or Cooper's Creek, is the longest of these. They are dry for a great part of the year, but after heavy rains they come down in flood, heavily loaded with sediment. Compare the floods and sediment of the Abyssinian tributaries of the Nile (§§ 121, 122). The whole Lake Eyre region is very dry, and there are stony plains, called gibbers[1], where hardly a plant can live.

232. The Murray-Darling. The Murray-Darling is the only long river of Australia, but it carries little water to the sea, and many of its tributaries are mere strings of pools when they are not in flood (§ 120). If we take the Darling as the main stream, and the Condamine as its longest tributary, the total length is 3,800 miles. The Condamine rises in the Queensland Highlands, about 80 miles from the coast. It receives many tributaries from the New England and Liverpool Ranges of New South Wales, the most important being the Macquarie. The Murray receives most of its waters from the Australian Alps, where both the Murrumbidgee and the Murray rise. These have a heavy rain and snowfall, and the Murray never runs dry. After its union with the Darling the river loses much water by evaporation as it crosses a dry region to Lake Alexandrina, through which it reaches the Southern Ocean.

233. The Western Tableland. The Western Tableland lies west of the Central Lowlands. Except on the

[1] Pronounce g hard.

narrow coastal plain it is a dry region, passing into desert. It consists of sandy or stony plains, and of thorny scrub in the better parts. The many lakes shown on the map are all salt. The whole region may be compared with the Sahara of North Africa. Notice in the coloured map that all the rivers flow from the edge of the plateau across a narrow coastal plain to the sea. Find the Mac-Donnell Ranges, almost in the centre of the continent. Here the country is less dry, and the rivers flowing to Lake Eyre sometimes carry water.

234. Gold is found in many parts of the tableland and its coastal plains. Several important fields are in the desert (§ 262). In spite of its mineral wealth and its vast size—it contains more than half the continent—the Western Tableland contains only a quarter of a million people. All Western Australia and most of Southern Australia are in this desert region, which measures about 1,000 miles from east to west and about 600 miles from north to south.

Exercises

1. Draw a map of Australia, showing the political divisions and marking the capital of each State. Insert also the Tropic of Capricorn.

2. Describe the Eastern Highlands of Australia.

3. What is meant by the artesian area of Australia? Is there any part of Africa with which you could compare it?

4. Draw a map of the course of the Murray-Darling, marking any towns you think important.

5. Why is the western tableland of Australia so thinly peopled? With what part of Africa would you compare it?

CHAPTER XXI

CLIMATE AND VEGETATION OF AUSTRALIA

235. Climate depends, as we know, partly on latitude, which affects the prevailing winds, partly on the size of the land and the distance of the interior from the sea, and partly on the position of the highest land. Where-ever the highest land lies in the track of the prevailing winds it receives most of the moisture brought by these winds, which pass on as dry winds. In our own country, where the prevailing winds blow from the west or south-west, the west receives heavy rain and the east is dry. In South Africa and Australia the prevailing winds blow from the east, and in both the high eastern heights take the moisture out of the winds and make the interior drier than if the highest land had been on the west.

236. Climate of Australia. In learning the geography of Asia (Vol. IV, ch. xv) we spoke of monsoon winds and their causes. We saw that they were winds which blew in summer from the cooler seas to the over-heated lands. The northern part of Eastern Australia receives heavy summer rains from the monsoon which blows south from the surrounding ocean. It also receives rain in winter from the south-eastern trade winds, which blow farther north as the Sun moves towards the equator. Consequently, the coastal plains of Queensland have rain all the year round, but most in summer. Farther south is the belt of trade winds, which part with their rain on the Eastern Highlands and blow over Central and Western Australia as dry winds. The extreme south has winter rains, brought by the westerly storm winds, which blow farthest north in winter. In summer this region is in the dry trade-wind belt.

237. There is, then, the same difference between the rainfall of East and West Australia as there is between the east and west of South Africa, but it is more marked because Australia is much broader from east to west. The greater part of Australia west of longitude 135° W. is almost rainless, and such rain as there is falls in violent storms.

238. Heat. In Australia, December and January are the hottest months. The temperature in the coastal plains is as high as that of the coastal plains of South Africa. The summer heat of the interior is still greater. The sky is cloudless, and the heat is reflected from the bare stones and sands of the desert. Captain Sturt, who explored the Australian desert, found that a match caught fire if dropped on the hot sands. The summers and winters are cooler in the southern part of New Zealand and New South Wales, which are in more temperate latitudes. In the higher parts of this region the winters are cold, and frosts occur. The winter nights are also very cool in the desert.

239. Australian Plants. Australia consists of several different regions: (i) the tropical coasts, with a hot warm climate and abundant rain; (ii) the tropical savanas of the interior, where the dry season is well marked; (iii) the sub-tropical coasts, with a moderate rainfall, chiefly in summer; (iv) the Mediterranean region, with warm dry summers and winter rains; (v) the interior, with little or no rain; (vi) the coastal plains of the west, with a scanty rainfall. Only the first region has an abundant rainfall.

240. When Australia was discovered the tropical lowlands were covered with dense tropical forests of palms, cedars, tree ferns, orchids, bananas, bamboos, pineapple, bread-fruit, and all tropical fruits. Tobacco is

indigo, wild ginger, pepper, nutmeg, and spices grew wild. There is an Australian baobab, smaller than that of Africa (§ 55). The commonest Australian tree is the eucalyptus, or gum tree (§ 200). It has small, dry, leathery leaves, which droop edgeways in the hot summer, so that the sun does not shine full on them. The eucalyptus secretes a strong-smelling oil which we all know. This helps to prevent the loss of moisture by evaporation. It is a hardy tree, and makes a region healthy. It has been introduced into the fever districts of Africa (§ 200), and into many healthy but dry districts, because it suits a dry climate well (§ 372). Some species become giants in the wetter parts of Australia, e.g. the jarrah and kauri of the southern corner of Western Australia. These trees are 300 or 400 feet high, and their indestructible wood is in demand all over the world for street paving. Giant eucalyptus trees also grow in the Mediterranean forests of Southern Victoria. Another common tree is the acacia, or wattle, with its feathery leaves, and yellow flowers not unlike a laburnum.

241. The grass lands or savanas of Australia lie west of the Eastern Highlands, and form the Darling Downs of Queensland and New South Wales. They are one of the finest grazing countries in the world, and much land is fit for growing wheat and fruit (§ 383).

242. The savanas pass into scrub in the drier west. Thousands of square miles in Victoria and the south of South Australia are covered with mallee, a dwarf eucalyptus. The dense brigalow scrub consists of dwarf acacia bushes, and is so thick that a way must be cut through it. The mulga scrub, so dreaded by explorers, is a sharp spiny plant, growing in low bushes. The spinifex, which is still more formidable, has stiff sword-like leaves, which make bleeding wounds on the legs of



Fig. 41. Eucalyptus Trees

Notice the eucalyptus trees in the background and the absence of bushiness in their shape. They give much less shade than most English trees.

animals or men. None of these are of any use for pasture, though the natives find water in the mallee roots. The only valuable scrub is the saltbush, which covers vast tracts of low-lying country. It resists long periods of drought, long after grass has withered, and sheep eat it greedily.

243. Cultivated Plants. Very little of Australia is well-fitted for agriculture. The plains of the north coast have a tropical climate, but are little cultivated at present. They would produce many tropical crops, but white labour is scarce, and it is doubtful if white men could work hard in the tropical climate. The tropical plains of North-east Queensland have been cleared of tropical forest, and brought under cultivation. Coloured labour was used for the work, but is now discouraged. Sugar, one of the most important crops, is largely grown in the river bottoms. In the fertile plains of Western Queensland and New South Wales fruit and wheat are grown under irrigation. The Riverina district of New South Wales is extremely fertile, and will be rendered more so by the damming of the Murrumbidgee. A great dam, 200 feet high, will hold back the flood-waters of the river and form a huge artificial lake. This will be used in the same way as the waters of the Nile stored up above the Aswan dam (§ 131). The Mildura region, at the confluence of the Murray and Darling, has also been made fertile by irrigation. Wheat is grown in Victoria, and some of the finest wheat in the world is produced in the peninsulas of South Australia. In the Mediterranean climate of Victoria and parts of South Australia vineyards do well, and Australian wines are exported.

Exercises (see p. 120).

CHAPTER XXII

ANIMALS OF AUSTRALIA

244. Native Animals. When Australia was first explored at the end of the eighteenth century it contained many animals which exist nowhere else in the world. The largest, the kangaroo, carries its young ones in a skin pouch, as do the opossum and many others. It jumps, instead of walking, and has a kind of upright position. Among other strange creatures were a three-eyed lizard, and a fish which had lungs instead of gills. The birds were remarkable for their beauty of colour. One of the most lovely is the lyre bird, so called from the form of its tail. The wingless emu is a kind of ostrich.

245. The white settlers have introduced all the domesticated animals of the Old World, including the camel, which is used in the desert (see Fig. 45). There are now about 90 million sheep, 11 million cattle, and 2 million horses. The numbers vary, for in the dry years at the beginning of this century millions of animals died for want of food and water. Sheep are bred both for wool and mutton, and are kept on the drier grass lands and in the saltbush country. A dry climate improves the quality of the wool, and prevents foot rot and other diseases. New South Wales produces as many sheep as all the rest of the continent.

246. Cattle stand heat better than the thick-woolled sheep, but they need more moisture. Dairy cattle need moister pastures than those bred for beef. Cattle are most numerous in Queensland, and all the chief dairy districts are on the coastal plain. The export of butter to Europe began in 1890 and is now a very important industry. The frozen meat trade began in 1880 and is

also growing. Hides, tallow, and glue are other important animal products.

247. Along with his useful animals man has introduced vermin. The rabbit eats pasture which is needed by sheep. Thousands of miles of rabbit-proof netting have been put up at the great cost of several million pounds. In the season rabbit-trapping causes a labour famine on many sheep farms. The skins are sent to Britain to be dyed and made up into expensive furs, and frozen rabbits are exported.

248. Products of Australia. Until 1850 Australia was almost entirely a pastoral country, though some wheat was grown in South Australia. The discovery of gold in the Ballarat Highlands of Victoria in 1851 and 1852 led to a rush of settlers. Many gold finds have since been made; and though wool is by far the most valuable export, gold is the second. Next comes wheat, butter, copper, silver-lead and tin. Frozen meat, tallow, sheep-skins, and rabbit-skins follow.

Exercises

1. Draw a plant map of Australia, cross-shading the forests, slanting the shading on the grasslands, dotting the scrub lands, and leaving the deserts white.
2. Show how the Australian plants are fitted to bear the Australian climates.
3. Name the chief cultivated plants of Australia, and say where each is important.
4. Name some peculiarities of the animals of Australia.
5. Are the plant or animal products of Australia the more valuable? Why?

CHAPTER XXIII

THE COMMONWEALTH OF AUSTRALIA

249. Natural Regions of Queensland. Queensland consists of three regions, each with its special industries. The first is the eastern coastal plain, from 20 to 100 miles wide. The rivers which cross it are often flooded and have covered the plain with fine alluvial soil. They form bars at their mouths, but good harbours can be made. This plain was once covered by tropical forests, which produced coco-nut and other palms, and such timber trees as the Moreton Bay pine and the cedar. Saw-mills were built by the rivers, and clearing was both quick and profitable. The cleared land is now planted with cotton, sugar, and other tropical crops. There are also dairy-farming districts, meat factories, &c. The second is the highland region, which is rich in gold, copper, coal, &c. The third is the western pastoral tableland, which sinks to the Central Lowlands. Its fine pastures feed millions of sheep and cattle. The boring of wells in the artesian area has increased the land available for sheep and stock farming (§ 230). Wool and meat are sent to the coastal ports. The Darling Downs, round the Condamine River, have a fertile volcanic soil, and are becoming agricultural. Wheat and fruits are the chief products.

250. Brisbane, the capital, on the Brisbane River, 25 miles from where it enters Moreton Bay, is the largest town. The other towns are chiefly small ports. Ipswich, an inland town, a few miles from Brisbane, is the outlet for a rich farming country and has some manufactures. Maryborough is the outlet for a district which grows maize, the largest Queensland crop according to acreage, potatoes, bananas, sugar, oranges and

other tropical plants. Rockhampton is the outlet for the rich Fitzroy valley district. Mackay, about 600 miles north of Brisbane, is the centre of the sugar district, but bananas, coffee, and coco-nuts are also grown. Stock-raising is also important in the neighbourhood, and both gold and coal are found. Townsville, nearly 900 miles north of Brisbane, is the port of the Burdekin sugar districts. Among inland towns are Mount Morgan, with gold and copper mines, and Charters Towers, the centre of the largest Queensland goldfield, both in the highlands. In the pastoral west are the small towns such as Toowoomba, on the Darling Downs. Ipswich is a coal-mining and a manufacturing town near Brisbane.

251. The Great Barrier Reef. The coral insect lives in warm shallow tropical seas, and builds up islands and coral reefs. The Great Barrier Reef, built of coral, fringes the coast of Queensland for 1,200 miles. Calm seas studded with coral islands separate it from the mainland.

252. New South Wales. This, like Queensland, consists of plain, highlands, and western tableland and plain. Oranges are the chief fruit crop, and wheat covers the largest acreage. The coastal plains are broadest in the Hunter River valley. The industries are agriculture, timber-cutting, coal-mining and dairy farming. Sugar, maize, bananas, and pineapples are grown in the hotter north. The Hunter coalfield is the largest in the southern hemisphere. The highlands are rich in gold and coal. Cattle do well in the south, and sheep in the north. Tin is found in the New England Highlands, and gold round Bathurst.

253. The western tableland and plains are a fine pastoral country, and much land, especially in Riverina, is planted with wheat. The silver-lead mines of Broken Hill are the most productive in the world.



Photograph by B... B...os [garbled in scan]

Fig 42 Sydney Harbour

254. Sydney, the capital, on the magnificent harbour of Port Jackson, is almost in the centre of the coast. The population is over half a million, or one-eighth of the population of Australia. Coal is found all round the town and under Sydney itself. Much fruit is grown in the neighbourhood. 100 miles north is Newcastle, the chief coal port, at the mouth of the Hunter. The Illawarra district, south of Sydney, where the highlands reach the sea, is a dairy-farming district, producing butter which is frozen and exported. Goulburn, on the main line from Sydney to Melbourne, produces maize and other cereals, butter, cheese, and bacon. Bathurst, on the Macquarie, in the highland region, is in a mining, farming, and pastoral district. Farther west is Albury, on the Murray, the frontier station between New South Wales and Victoria. Passengers change trains here, as the railways of the two States have different gauges. The Murray is navigable up to Albury in good seasons. Broken Hill, over 900 miles from Sydney, is most easily reached through Melbourne and Adelaide. The other towns are small market centres.

255. Victoria. Victoria, the smallest of the Australian States, is the most thickly peopled. It occupies the south-eastern corner of the continent, and is separated from New South Wales by the Murray. Port Phillip, which forms Melbourne harbour, is the finest of many good harbours. Broadly speaking, it may be compared with Cape Colony (ch. xvii) and Argentina (ch. xxxi).

256. Victoria is crossed from east to west by the Australian Alps, which are over 6,000 feet high. The forests contain giant eucalyptus trees, exceeding 400 feet. South of the highlands is what is the Great Valley of Victoria, which is separated from the [illegible] by



By permission of the South Australian Government.

Fig. 43. Sheep Shearing in Australia.

In the shearing season experienced shearers travel from run to run, and can shear a sheep in a few minutes.



By permission of the South Australian Government.

Fig. 44. Wool Sorting and Packing.

the mountains of the Otway Peninsula and of Southern Gippsland, east and west of the great break made by Port Phillip. The southern slopes of the Victoria Highlands are drained by short rivers, which cross the fertile and beautiful Gippsland district to the sea. The northern slopes are drained to the Murray. West of about long. 145° E. the rivers run dry or end in salt marshes or swamps. Large districts in this dry region are covered with mallee scrub, which is so dense that the land has to be cleared by teams of oxen. When cleared it makes fine wheat land.

257. Sheep farming is the chief occupation, and Victoria produces the finest merino wool in the world. In early days settlers or squatters took up enormous tracts of unoccupied land, and kept huge flocks with comparatively little labour. To-day labour is more abundant and markets are open in Europe. It now pays better to cut up the big sheep runs in the wetter districts into smaller dairy farms. The milk is collected and manufactured by co-operative dairies, where the best machinery can be used. The butter industry pays so well that the forests of Southern Gippsland are rapidly being cleared to make room for more dairy farms. Gold ranks next to wool. The Victoria Highlands are rich in gold, and some of the earliest and richest discoveries were made round Ballarat and Bendigo. The warm dry climate suits wheat, and the flour milled from it is equal to Hungarian flour. All kinds of fruit are grown, including oranges, lemons, and apples. The Mediterranean climate of warm summers and winter rains brings the vine to perfection (§ 201). The vineyards are planted on the sunny slopes, which in the southern hemisphere face the north, and not the south as in this country.

258. Melbourne, the capital, has a population of over half a million, and ranks with Sydney. It is a great port, with growing manufactures, and is a large, handsome, and well-built city. Geelong, the second port, exports the wool and wheat produced on the western plains. Ballarat, 100 miles from Melbourne, is the chief gold-mining centre, and mines have been carried down to over 4,000 feet. Bendigo, 75 miles from Melbourne, is less important than it was in the last century.

259. Tasmania. The mountainous island colony of Tasmania is separated from Victoria by Bass Strait. It is a fragment of the Eastern Highlands of Australia, and rises to over 5,000 feet. Its mountain, lake, and gorge scenery are very beautiful. The Tamar is the chief river flowing to Bass Straits. Find the latitude of Tasmania on the globe. It lies in the 'roaring forties', where the westerly winds blow with great strength (§ 38). Much rain falls on the west, but the east is dry. The forests are very dense in the west, but drought is not uncommon in the east. The highlands are rich in copper, lead, silver, coal, and iron. Fruit growing is important. In spring we can buy large juicy Tasmanian apples which have been exported in a frozen state. Pears, peaches, plums, and cherries are also grown. The capital is Hobart, at the foot of Mount Wellington, among some of the finest scenery in Australia. Launceston, the chief commercial town, on the Tamar, is a busy port in a fruit-growing and tin-smelting district.

260. South Australia. This is the second of the colonies in size. The Northern Territory belongs to the Commonwealth of Australia. The coastal plains of Arnhem Land and the Gulf of Carpentaria have a tropical climate, and would produce tropical crops if labour were to be had. Farther south the country is

a vast desert, forming part of the dry Western Tableland. Palmerston on Port Darwin, with a fine harbour, is the centre of pearl and pearl-shell fisheries.

261. The greater part of South Australia proper is also desert. Find on the coloured map the rift valley of South Australia, formed by the salt lakes and swamps of Lake Torrens and the submerged Spencer Gulf. This separates the Western Tableland from the South Australian Highlands. These rise steeply above the rift valley on the west, and fall steeply to the plains of the Murray and Lake Eyre. Settlement and agriculture are confined to the region round Spencer Gulf. Fine wheat is grown in the southern peninsulas, and sheep farming is also important. Mining is less important than in the other colonies. The only large town is Adelaide, the capital. Adelaide is finely situated within sight of an amphitheatre of hills, but has less than a quarter of the population of Sydney or Melbourne.

262. West Australia. West Australia, the largest colony, contains one-third of Australia, but less than a quarter of a million of people. It consists of a tableland, with narrow coastal plains. These are fertile in the north but are as yet hardly settled. The few towns are either goldfields or ports. The pearl and pearl-shell fisheries are important. The plains along the west coast are rather dry, except in the south-west, which has more rain. The hard jarrah and karri eucalyptus trees of the south-west forests are used for harbour piles, railway sleepers, wood paving, &c. Gold is the chief product of West Australia. In 1892 this was discovered in the desert, 350 miles from the coast. It is probably abundant all through the desert, but whether it can be carried to the diggings. Water is pumped to



By permission of the South Australian Government.

Fig. 45. Team of Camels Carrying Water Tanks through the Northern Desert of South Australia

Kalgurlie and Coolgardie through pipes for over 300 miles. Kalgurlie, the chief town of the Coolgardie goldfield, the famous 'Golden Mile', contains some of the most famous gold mines in the world. It is strange to find every convenience of life in this mushroom city, planted down in the midst of the desert, but connected by rail with Perth, the capital, on the Swan River. The port is Freemantle, at the mouth of the Swan River. Geraldton, the largest town north of Perth, is the outlet for the Yalgoo goldfield of the northern desert. It exports gold, copper, lead, and some wool and sandal wood. Albany is the southern port.

Exercises

1. Write a short account of Queensland, with a map showing the most important rivers and towns.

2. Compare New South Wales with (*a*) Queensland and (*b*) any part of Africa which seems to you like it.

3. Compare Victoria and South Africa, especially with regard to climate and products.

4. With what part of Europe would you compare Tasmania? What are the chief natural advantages of Tasmania?

5. Compare South and West Australia.

CHAPTER XXIV

NEW ZEALAND

263. Position. Find New Zealand on the globe, and write down its latitudes. It consists of a number of islands. The two largest are North Island and South Island, which are separated by Cook Strait. This is less than 20 miles across at its narrowest, and has some good harbours. South of South Island is the small Stewart Island. Find Auckland in the coloured map in the north of North Island, and Dunedin in the south of South Island. These two cities are 600 miles apart, so that the total length of New Zealand is not very different from that of Great Britain, which measures 600 miles from John o' Groats' House to Land's End.

264. Cape Van Diemen, in the north of North Island, is nearly in lat. 34° S. South Cape, in the south of Stewart Island, is nearly in lat. 47° S. Notice then that New Zealand is farther from the equator than any part of South Africa, and quite outside the tropics. Part of it is in the latitude of Victoria and Tasmania in the southern hemisphere, and of Italy in the northern hemisphere. Notice how its shape and situation affect its climate. While Australia is a broad compact land mass, New Zealand is a long narrow island belt, fully exposed to the influence of the sea and of the storms which rage in the 'roaring forties' (§§ 38, 259). No part is far from the sea, and the temperate climate has no extremes of temperature. Look at the coloured map, and you will see that most of it is high. This also helps to reduce the temperature and make it cool for the latitude.

265. The coloured map shows that the sea has cut deeply into the land, especially in the north of North Island and south of South Island. This gives New Zealand many fine harbours. Strong currents run round the islands and heap up the river sediment into bars at the mouth of the rivers. The cliffs are generally high and rugged, especially on the west, and rise out of deep seas. Notice the fiord coasts of the south-west of South Island. Here the sea has drowned the valleys which run inland between the mountain ranges, and turned them into deep fiords shut in between high richly-wooded mountain walls. The scenery of these fiords reminds us of Norway or the West of Scotland.

266. Climate. We know that latitude is only one of the causes which affect climate, and that height above the sea and the influence of prevailing winds are both important. The climate of New Zealand is much more temperate than it would be if it were part of the mainland of Australia. The North Island has a warmer summer than South Island, but near Auckland the olive, orange, lemon, and fig do as well as in Italy. Palms are not uncommon, and parts of the northern coast are fringed with mangrove swamps. All over North Island azaleas and camellias flower out of doors (§ 51). South Island has a climate much more like that of our own country.

267. The coloured map shows that in New Zealand, unlike Australia and South Africa, the highest land is in the west. As New Zealand lies in the 'roaring forties' it is in the track of the strong westerly winds, which often blow as hurricanes. These westerly winds bring a very heavy rainfall to the high west coast, but the east is much drier. Most of New Zealand is forested, except in the eastern plains of South Island.



Photograph by Underwood & Underwood.

Fig. 46. A New Zealand Fiord.
Notice that some of the mountains shutting in this fiord (Milford Sound) are high enough for perpetual snow.

268. Mountains, Rivers, and Lakes. North and South Island have very different scenery. The coloured map shows that both are mountainous, and the mountains are really one chain, broken by Cook and Foveaux Straits. North Island has volcanoes, mud volcanoes, hot lakes and springs, and geysers which throw up columns of boiling water and make strange volcanic scenes. Mount Egmont, one of many extinct volcanoes, on a promontory of North Island, rises to over 8,000 feet, and is one of the most beautiful volcanic cones in the world. South Island has scenery not unlike that of the Italian Alps. The mountains are called the New Zealand or Southern Alps, and have great glaciers, long narrow valley lakes, rushing streams and waterfalls, and dark forests. The highest peak is Aorangi, often called Mount Cook (over 12,000 feet). Some of the finest scenery is on the south-west coast, where glaciers descend to the forest line, and deep winding fiords pierce far into the mountains.

269. The New Zealand Alps sink on the east to the dry level Canterbury plains of fine grass lands. They are nearly 160 miles long and about 30 broad, and open to good harbours. There are few other large plains.

270. Plants, Animals, and Occupations. New Zealand, with its ample rain, is a forest country, except in the eastern plains. The Kauri pine yields strong timber and valuable gum. In North Island, fossil kauri gum, from forests long since dead, is dug out of the ground. The red and white pine yield good timber, and the eucalyptus is common. Tree ferns grow to the height of 60 feet, and there are beautiful flowers. The landscape is as varied as that of Australia is monotonous. Oranges, lemons, and Mediterranean plants are grown in North Island, and English fruits in South Island.

In the grass lands is grown the valuable New Zealand flax. There were few native animals when New Zealand was settled last century, but domesticated animals have now been introduced (§ 244).

271. New Zealand is a young country, and the occupations are still simple. As population grows manufactures will develop, for New Zealand has many natural advantages. Coal is abundant, and the swift mountain rivers provide inexhaustible water-power for making electricity.

272. The Canterbury plains will always be a sheep-farming country, producing both wool and mutton. The export of frozen Canterbury lamb is a very important industry. The making of butter and cheese, the preparation and export of hides, tanning, and the manufacture of boots and shoes, are growing occupations.

273. There are only four towns of any size. These are Auckland, in North Island, on a magnificent harbour; Wellington, on Cook Sound, the capital; Christchurch, an inland town on the Canterbury Plains; and Dunedin, in the plains of South Island.

Exercises

1. Draw a map of New Zealand, marking the chief towns and rivers.

2. New Zealand is often called the antipodes of Britain? What does this mean? Is it true? How would you word the comparison yourself?

3. Describe the climate of New Zealand, and compare it with that of Australia.

4. Name the chief occupations of New Zealand. State where each is carried on, and why.

CHAPTER XXV

SOUTH AMERICA

274. Size of South America. South America, with an area of 7,000,000 square miles, is midway in size between Australia (3,000,000 square miles) and Africa (11,000,000 square miles).

275. Comparison with the other Southern Continents. South America is very like Africa in shape, but this is unimportant in comparison with the difference in latitude. Look out on the globe the latitudes which bound the two continents. The parallel of 10° N. lat. only just cuts the north coast of South America, but it crosses the broadest part of Africa. Nearly all South America lies south of it in hotter latitudes, and half of Africa lies north of it in cooler latitudes. Notice next that South America is broadest between the equator and 20° S. lat., but that Africa narrows in these latitudes. This again is a very important difference. Notice once more that South America stretches much farther towards the pole than Africa, into latitudes corresponding with those of Southern Scotland, while the extreme south of Africa is nearly in the latitude of the Plate River in South America.

276. The coloured map will show us other important differences. In Africa the highest land is near the equator, but in South America most of the equatorial region is under 600 feet. Notice, too, how differently the high land is arranged. Africa is a plateau, like Australia, with a high interior rising steeply from narrow coastal plains. In South America the great mass of the continent is low, except along the Atlantic and Pacific margins. As in North America, we find a belt c -

lands fringing the Atlantic coast, and a belt of very high mountains rising steeply from the Pacific coast, and running the entire length of the continent.

277. The arrangement of high and low land reminds us of Africa and Australia. In all three continents the eastern edge is higher than the interior. This affects the amount of rain which falls in the interior, and the size and position of the forests, savanas, and steppes.

278. The resemblances between South America and the two other southern continents are not so close as they would be if they lay more nearly in the same latitudes, and had their high and low land arranged on the same general plan. Notice, however, one striking likeness between South America and Africa. In each continent a huge river flows through the hot wet equatorial belt, a little south of the equator, and nearly parallel to it. Owing to the position of the higher land the Amazon flows east in South America, while the Congo flows west in Africa, but this is not of great consequence. Both rivers are fed by the equatorial rains and carry an enormous volume of water out to sea. There is also some resemblance between the position of the Orinoco in South America and of the Niger in Africa. Both enter the sea in almost the same latitudes.

279. There is also a general similarity in the way in which the waters of the ocean circulate. The warm current which flows from the equatorial seas along the east coast of South America may be compared with the warm current which flows along the eastern coast of Africa. A cool current from the polar waters, caused in the same way as the cool currents off the west coasts of Africa and Australia, flows along the west coast of South America, northwards from the shores of Chile. I [illegible] lled the Humboldt current.

280. Natural Divisions of South America. The coloured map shows that South America consists of four well-marked regions: (i) the high Andes in the west, fringing the Pacific coast; (ii) the lowlands of the Orinoco, Amazon, and Plate rivers; (iii) the Eastern Highlands, divided into the Guiana Highlands in the north and the Brazilian Highlands in the south; and (iv) the narrow tableland of Patagonia in the south.

281. Political Divisions. South America was conquered and civilized by the Spanish and Portuguese adventurers of the fifteenth and sixteenth centuries. These conquerors found a highly civilized race living in the high healthy plateaus of the Andes, and even the most ignorant of the wandering forest tribes were less degraded than some of the African forest negroes. The Spanish conquest of South America has left a lasting mark on the civilization of the continent. The Spanish rulers were driven out by descendants of the original conquerors at the beginning of last century, and what had been Spanish and Portuguese colonies became republics, with the exception of two small French and British colonies. The traveller in South America is constantly reminded of Europe, and particularly of Spain, and Spanish is the almost universal language.

282. Find on the map the Andean republics of Colombia, named after Columbus; Ecuador, so called because the equator crosses it; Peru, Bolivia, and Chile. All of these consist chiefly of mountains and high plateaus, and all but Bolivia have a coastline on the Pacific. On the north or Caribbean coast are Venezuela and the Guianas. On the east are the huge republics of Brazil and Argentina, and the smaller ones of Uruguay and Paraguay. Paraguay, like Bolivia, has no seaboard.

Exercises

1. Draw a map of South America, marking the chief rivers and shading the land over 3,000 feet.

2. Draw a map of South America, showing the political divisions.

3. Draw a map of South America, shading the land between the tropics.

4. How far can you compare South America with (*a*) Africa and (*b*) Australia?

5. What are the natural divisions of South America (*a*) according to latitude, and (*b*) according to height?

6. Compare the rivers of South America and Africa.

7. Draw a map of South America, showing the three longest rivers.

CHAPTER XXVI

CLIMATE, PLANTS, AND ANIMALS OF SOUTH AMERICA

283. Temperature. Find the Tropic of Capricorn on the globe and on the coloured map. It crosses the north of Chile, Bolivia, Paraguay, and the south of Brazil. The Chilean city of Antofagasta, and Rio Janeiro, the capital of Brazil, are both almost on it. Most of South America lies within the tropics, and has a hot climate all the year round at sea-level. Rain falls most abundantly in the equatorial belt, but elsewhere the wet and dry seasons are well marked. In the high Andes many different climates are experienced at different heights in [illegible] latitudes. Except in the north the seasons are th[illegible]osite of those in this country.

284. The inhabitants of the Andean lands distinguish three regions, according to the height. These are well marked except in the Southern Andes. The *tierra caliente*, up to about 3,000 feet, is the hot belt, where only tropical plants can be grown; e. g. the coco-nut palm, banana, rubber, cacao, sugar, and rice. The *tierra templada*, or temperate belt, between 3,000 feet and 6,000 or 7,000 feet, produces all the plants of warm temperate lands, and the *tierra fria*, or cool belt, those of cool temperate lands. Above about 8,500 feet are the cold bleak *paramos*, where vegetation gradually disappears, and still higher are snowfields and glaciers.

285. Rainfall. The rainfall of South America depends partly on the latitude and partly on the height of the land. Within 5° of the equator the air is intensely heated by the hot land, and is always rising. As it rises into higher cooler layers of the atmosphere it parts with its moisture as rain. The two wettest periods are at the equinoxes, when the Sun is overhead at the equator. Then the rivers are flooded, and overflow the low-lying country, which is densely forested.

286. North and south of this belt are the llaños with a hot wet summer and a warm dry winter. The north-east trade winds bring heavy summer rains to the Guiana Highlands and the coast of the Caribbean Sea, where the forests are very dense. The interior has less rain, and is a savana land. The east coast of Brazil receives rain from the south-east trade winds, especially between October and April, and is forested. The interior receives much less rain and is savana.

287. The south-east winds reach the eastern slopes of the Andes and are forced upwards into cooler regions of air. The result is that the eastern slopes of th[illegible]des have a very heavy rainfall and are densely [illegible]ted

(§ 307). The western slopes have a scanty rainfall, and not nearly so rich a plant life.

288. Outside the trade-wind belt this state of things is reversed. South of about 35° S. lat. the prevailing winds blow from the west and strike the western slopes of the Andes first. These are densely forested, but the eastern slopes are much barer. Patagonia, which lies east of the Andes, in the belt of prevailing westerlies, is a dry steppe region.

289. This distinction is important and must be remembered. In the equatorial belt both slopes of the Andes and the lowlands east of them receive abundant rains and are densely forested. We may compare this region with the Congo basin of Africa. South of 5° S. lat. the western slopes of the Andes receive little rain and part of the west coast is a desert. South of lat. 35° S. the western slopes are wet and forested, and the eastern slopes and lowlands are dry.

290. Three things are characteristic of the climate and plant life of South America: (i) the great variety of climates and products in the high Andes; (ii) the vast extent and density of the equatorial forest; and (iii) the great area of the savanas in the lands which receive summer rains only.

291. The Selvas of South America. The forests of the Amazon and its tributaries are even more dense than those of the Congo. Men may travel for weeks or months in these great forests and know only a fraction of them. The whole Amazon lowland is cut up by great rivers, to which flow innumerable streams, and in the wettest months all are swollen into lakes. This dense forest, where rivers are the only roads, is little fitted to be [illegible] home of either man or beast. The Indian pushes [illegible]-out canoe, rudely made out of a hollowed log, [illegible]he streams, to catch fish and turtle, and to hunt

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289. This distinction is important and must be remembered. In the equatorial belt both slopes of the Andes and the lowlands east of them receive abundant rains and are densely forested. We may compare this region with the Congo basin of Africa. South of 5° S. lat. the western slopes of the Andes receive little rain and part of the west coast is a desert. South of lat. 35° S. the western slopes are wet and forested, and the eastern slopes and lowlands are dry.

290. Three things are characteristic of the climate and plant life of South America: (i) the great variety of climates and products in the high Andes; (ii) the vast extent and density of the equatorial forest; and (iii) the great area of the savanas in the lands which receive summer rains only.

291. The Selvas of South America. The forests of the Amazon and its tributaries are even more dense than those of the Congo. Men may travel for weeks or months in these great forests and know only a fraction of them. The whole Amazon lowland is cut up by great rivers, to which flow innumerable streams, and in the wettest months all are swollen into lakes. This dense forest, where rivers are the only roads, is little fitted to be the home of either man or beast. The Indian pushes his dug-out canoe, rudely made out of a hollowed log, along the streams, to catch fish and turtle, and to hunt

for turtle eggs. Alligators sun themselves on the banks, but there are few other signs of life. The monkeys, parrots, and other forest creatures live high overhead, in the upper branches. It is only along the banks of the rivers, which make a break in the solid mass of trees, that the beauty of the forest can be seen. On the rivers themselves are the splendid blooms of the *Victoria regia* lily, and of other richly coloured water-lilies. Away from the rivers the forest depths are dark and gloomy, and flowers are seldom seen, for these grow high above.

292. This forest is so difficult to penetrate that its great wealth is hardly used. The rubber collector is busy, but rubber is only one of a thousand valuable plants. There are magnificent timber trees, beautiful in colour and strong in grain, but they cannot be cut down and sent to market because of the cost of labour. Every kind of fruit and tropical crop could be grown if clearing and settlement were less difficult. There are clearings round a few river ports, but elsewhere this vast region is a land of plants and not of men.

293. The Savanas. The savanas, or tropical grass-lands of the Orinoco, are called llaños. They consist of good grass, with belts of forest along the rivers. Palms are abundant in the moister parts. These savanas are small compared with the pampas of Argentina. The pampas fascinate those who know them in the same way as the steppes of Asia, or the veld of South Africa. For about 200 miles from the coast the land is covered with clover or with huge thistles of exquisite beauty. There are great tracts of pampas grass, that plant which we grow in our gardens for its feathery head. Elsewhere there are boundless plains of grass, which change in colour with the season[illegible] The pampas are a land of green and gold, with pa[illegible] of richly-flowering plants, when rain first falls on the

thirsty land. These gay colours change to dull brown as the dry season comes on.

294. Some South American Plants. Only a few of the more important plants of South America can be named. Rubber is gathered all through the forest region of the Eastern Andes. The chinchona tree, from which quinine is made, is invaluable as a remedy against fever. It has been introduced from South America into the less healthy parts of other tropical lands. A plant much prized by the Indians is coca, which like the African kola, enables them to bear great fatigue on a scanty diet. The potato, which is now grown all over the world, was not known till the Spaniards discovered South America, nor was maize nor tobacco. Maté, a plant which grows wild in Paraguay, takes the place of tea. Many plants have been introduced from other lands. Coffee does as well in Brazil as in the best parts of Africa, and cacao is also grown. Cacao is a tender plant, and must be shielded from a strong sun. The seedlings are planted under the shade of forest trees, and do well on the lower slopes of the Andes. Sugar is an important crop round the Caribbean Sea and in Eastern Brazil. Rice and cotton are also grown.

295. The rolling pampas, like the prairies of North America, can easily be ploughed and reaped by machinery. The wetter parts of them are being turned into great wheat lands. These are golden with their harvest when the prairies of North America are held in the grip of frost.

296. Some South American Animals. Alligators and turtles haunt the forest rivers, and snakes are common. Apes and many other tree animals live in the forests. Neither the lion, tiger, nor elephant is found, but the jaguar and puma, both great cats, are common.

The birds include the humming-bird and many parrots. The turkey is a native of South America. The great condor, a native of the Andes, sails high in the air above the valleys. The locust (§§ 96, 202, 307) and the mosquito are as much dreaded as in Africa.

297. The llama, a kind of ox, with a thick woolly coat which protects him against the cold, is a native of the high Andes. Like the yak of Tibet the llama is used as a beast of burden at great heights. The wool is very soft, and used for making clothing. The vicuña and the alpaca, both natives of the Andes, produce valuable wool and hair. The Spanish conquerors introduced horses and cattle into the savanas, where they now number many millions.

NOTE ON PRONUNCIATION

Most of the geographical terms used in South America are Spanish. The letter n has two sounds: when written n, as in savana, it has almost the English sound; when written ñ, as in cañon, it has a nasal sound, not unlike the English ny. Cañon is pronounced and often written canyon.

Exercises

1. Explain clearly the climate belts of the Andes. What does each produce?

2. Explain the fact that in some latitudes the western slopes of the Andes are the wettest, and in others the eastern.

3. Compare the Congo and Amazon basins.

4. Describe the pampas of Argentina. With what other parts of the world would you compare them, and why?

5. Show how South America has enriched the world with new plants and animals.

CHAPTER XXVII

THE ANDES

298. The Andes. The Andes, one of the longest and highest mountain chains in the world, border the entire length of the Pacific coast. They consist of many parallel ranges, and are several hundred miles broad at their broadest. The coastal plain which lies between them and the Pacific is nowhere 100 miles wide. The seas off this coast are very deep and many changes have taken place here in the Earth's crust. As we should expect, there are many active volcanoes, and earthquakes are common.

299. In Colombia and Ecuador the Andes form three main ranges. These are separated by the wild deep gorges of the Magdalena, which flows north to the Caribbean Sea, and its tributary, the Cauca. These three ranges unite near the equator, but spread out again to the south. They are called the west or coastal ranges; the main or Pacific ranges; and the eastern ranges.

300. The coastal ranges are separated from the main or Pacific ranges by valleys, which are fertile in the rainy belt but deserts in Southern Ecuador and Peru. In Southern Chile the westerly winds bring abundant rains, and the valley of Chile, between the coastal and the Pacific ranges, is very fertile. Still farther south the coastal ranges are partly submerged, and form an island fringe along the much-indented coast.

301. The Main Chain of the Andes. The highest peaks of the Andes are in the main chain. Cotopaxi, the highest active volcano in the world, and the still higher ...t Chimborazo, are in the Ecuador Andes, almost

on the equator. A climber who was camping on Chimborazo saw an eruption of Cotopaxi: 'More or less smoke mingled with steam was always issuing from the crater of Cotopaxi, and rolled out in a leisurely way. It was difficult to believe that it could be a very dangerous volcano. Yet we ourselves witnessed from a distance of 65 miles an eruption of ash which was shot up 20,000 feet into the air. It poured out in such a volume that even at that great distance it was as dark as twilight soon after midday. But Cotopaxi has done worse than that, and what are most feared are the floods which roll away from it after the greatest explosions'. These are caused by the melting of the snows which cover its high cone.

302. The Plateaus of the Andes. Many high plateaus are enclosed between the main chain and the eastern ranges. Those of Bogota in Colombia, of Quito in Ecuador, and of Bolivia, are surrounded by high peaks. The climate is healthy, and the soil is fertile. The heat is great during the hours of sunlight, but it is very cold at night. Wood is scarce, and the Indians burn the droppings of llamas. Yak droppings are used in the same way in Tibet (Vol. IV). People keep themselves warm by wearing ponchos. The poncho is a warm blanket, made of llama, or vicuña wool, with a hole through which the head is put.

303. In Bolivia the Andes are 500 miles broad but farther south they narrow. The highest peak in the Andes is Aconcagua (23,000 feet), in the Chilean Andes. Its snows tower above the Cumbre or Uspallata Pass (12,800 feet), which leads from the valley of Chile to Argentina. High as this pass is, it is lower than any others for several hundred miles north of it. It has always been an important route between east and



Photograph lent by the Royal Mail Steam Packet Company

Fig. 47. LLAMAS CARRYING ORE IN THE HIGH ANDES.



Photograph by Underwood & Underwood

Fig. 48. A WAYFARER IN THE HIGH ANDES.

Notice the snow peak in the mountain background, the line of [illegible]on along a stream, the barrenness of the country away from [illegible]yside shrine, and the poncho worn by the traveller.

304. The Southern Andes. South of Aconcagua the Andes narrow and few peaks are over 10,000 feet. The coast is fringed with islands and deeply cut with winding fiords, like those of Norway or New Zealand. The rainfall is very heavy, and violent gales often rage.

305. The Forests of the Andes. The highest slopes of the Andes are too high for trees, but in the north the eastern slopes are densely forested (§ 287). This forms the *montaña* region of Colombia, Ecuador, and Peru, where rubber and chinchona are the most important plants. The eastern ranges are cut by deep gorges and valleys through which rage the upper waters of great rivers which flow east to the Amazon and Plate. The forests of the Southern Andes consist of temperate trees, and are most abundant on the western slopes.

306. The Montaña of the Eastern Andes. A traveller writes thus of the Eastern Andes and the montana: 'It is here that the majestic beauty of the Andes is fully realized. Masses of dark mountains rise for thousands of feet, their bases washed by foaming torrents, and their summits terminating in sharp peaks or ridges. The lower slopes are covered with dense vegetation, and the green tints are often varied by masses of gorgeous flowers. Above the forest the grassy slopes are brightened by the yellow of calceolarias, and the rich purple of other flowers. As the ravines are descended the delicate pink and white of the chinchona blossoms begins to dot the hillsides. White sheets of foam rush down the polished sides of the precipice and seem to plunge into a bed of flowers and ferns. Everywhere the roar of falling water is heard. As the ravines open out wider views come into sight, and the illimitable plain stretches away in one unbroken forest, its green tints changing to faint blue on the horizon.'

307. Mineral Wealth. The Andes are very rich in minerals, particularly in silver and gold. The Spanish conquerors obtained enormous amounts of treasure from the mines. One of the richest silver mines is at Pasco, near the source of the great Huallaga River, which is one of the feeders of the Amazon. Another is at Potosi.



Photograph by Underwood & Underwood

Fig. 49. STREET SCENE IN CUZCO, PERU.
Notice the Spanish houses, showing Moorish influence, built on foundations of Inca masonry.

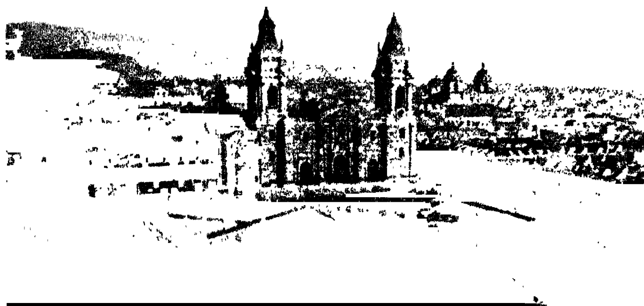
308. Ancient Civilization of the Andes. The Spanish conquerors found a civilized race in the high plateaus. These were the Incas. Every year the emperor turned a furrow with a golden plough, to show that the prosperity of a nation depends on agriculture. The Incas were skilful workers in metal. For their

weapons and tools they used a mixture of tin and copper which took as sharp an edge as steel. The secret of making this has long been lost. They had terraced, planted, and irrigated the mountain slopes, and built great bridges over the deep ravines that pierce the mountains. Their walls and temples were the admiration of the Spanish conquerors. They were built of gigantic blocks of stone, so perfectly fitted without the use of mortar that not even a knife blade could be thrust between them. How these were built remains one of the wonders of the world.

309. Railways in the Andes. There are a few fine cities on the Andes to-day, but they are probably less imposing than the ancient Inca cities. The great monuments of modern skill are the Andean railways. The scarcity of labour and of wood, and the difficulty of working hard and sometimes even of breathing at great heights, made the building of them extremely difficult.

310. In Peru a line has been built from Lima by Oroya to Pasco and carried across a pass 15,650 feet high. The scenery is perhaps the finest in the world. Lines run through Mollendo and Antofogasta from the Pacific coast to Lake Titicaca, on the Bolivian plateau. A trans-continental line now unites the Atlantic and the Pacific Oceans, and tunnels under the Uspallata Pass at a height of 10,300 feet. The route over the top of the pass is still used in summer, but is closed by snow in winter. On the summit of the pass, on the frontier between Chile and Argentina, is a colossal statue of the Christ of the Andes, put up at the end of the last war. Much traffic is still carried by mules and llamas, a slower but cheaper method than carriage by mountain railways.

311. A Railway Journey in the Andes.—A traveller from Mollendo to La Paz, the capital of I



Photograph lent by C. Reginald Enock, Esq.

Fig. 50. Lima Cathedral.



Photograph lent by C. Reginald Enock, Esq.

Fig. 51. On the Oroya Line.

Notice that the line is here above the tree limit.

passes first through the rainless coastal region, where prickly cactus, which look like organ pipes, are almost the only plants. About 100 miles from the coast the climb begins and in 20 miles the line climbs 3,000 feet, with towering peaks on one side and yawning gulfs on the other. The line is often carried along the edge of precipices which fall thousands of feet to ravines below. At a height of about 7,000 feet a river valley widens into a broad plain, which is green with maize, or Indian corn, barley, potatoes, and alfalfa or lucerne. In this plain is Arequipa, with many churches and a fine cathedral, at the foot of the great volcanic cone of El Misti (20,000 feet). The railway reachest its highest point at the top of a pass which is 14,666 feet high. The pass is free from snow in summer, but magnificent snow-peaks rise around. Even the hardy cactus cannot live at that height, and the only plants are a dry grass and a kind of resinous moss. Sheep, llamas, alpacas, and vicuñas, manage to live on this poor pasture, and scamper away as the train appears.

312. After this the line descends 2,000 feet to reach Lake Titicaca, which is partly in Peru and partly in Bolivia. The shores of the lake are cultivated and the surrounding slopes are terraced. La Paz is about 60 miles from the Bolivian side of the lake. The line crosses the *puna* or plateau of Bolivia, which contains about 10,000 square miles. High mountains shut it in, and the little mud villages are surrounded by cultivated land, which the peasants still till with crooked sticks instead of ploughs. At last the city of La Paz comes in sight, lying 1,200 feet below the level of the plateau in a deep depression (§ 330).

Exercises

1. Explain why the high plateaus of the Andes are more densely peopled than the coastal plains. Illustrate this by a comparison with Africa.

2. Describe the mineral wealth of the Andes.

3. What do you know of the railways which climb the Andes?

4. How far is it an advantage and how far is it a disadvantage to be an Andean country?

5. Give the meaning of the Spanish geographical terms used.

6. Write a full description of the illustrations in this chapter.

CHAPTER XXVIII

THE ANDEAN COUNTRIES

313. Colombia. Find Colombia on the coloured map and notice its good situation, with a coastline on both the Atlantic and Pacific Oceans. This will be a greater advantage when the Panama Canal is finished.

314. Most of Colombia is over 6,000 feet high, and crossed by ranges of the Andes which rise to three times that height. These fall steeply on the west to the Pacific coastal plain. In the east they sink to the grasslands of the Orinoco and the forests of the Amazon. The whole country is cut by deep river valleys, which make communication very difficult. All the rivers fall steeply in their upper courses, but some are navigable in their lower courses. Find the Magdalena, which con-

nects the high plateaus with the Caribbean Sea. It rises at a height of about 13,000 feet and falls half of that distance in less than 40 miles. After that it falls less swiftly, and there are navigable reaches between the different falls which interrupt it. For the last 200 miles it is a broad and noble river. Its chief tributary, the Cauca, another route to the best-peopled part of the country, also flows first in wild defiles, and then becomes navigable. Notice how many rivers flow east to the Orinoco and the Amazon.

315. The coastal plains are very hot, and are thinly peopled. The high plateaus of the *tierra templada* and *tierra fria* are healthier and better peopled. Most parts of the country have a very heavy rainfall and are forested. The driest part is in the lee of the Eastern Andes, where there are llaños or savanas.

316. Colombia has great natural wealth. Its forests are still little explored, but they produce rubber, chinchona, mahogany, and many other valuable plants. Agriculture is backward, but coffee, cacao, sugar, tobacco, &c., are grown in the clearings in the *tierra caliente*. Wheat and potatoes are grown up to 8,000 feet. Cattle are kept in the eastern llaños. The minerals include gold, silver, copper, coal, and asphalt. Fine emeralds are also found.

317. In spite of its natural wealth Colombia is neither well peopled nor highly civilized. This is partly due to the difficulty of communication. Roads are difficult to make, and still more difficult to keep up in the rainy season. Most of them are very bad. There are few good bridges across the innumerable ravines and hardly any railways. Secondly, labour is scarce, dear, and bad. The mass of the people have more Indian than white blood and little education.

318. The west coast is thinly peopled. The chief port is Buenaventura, a small place. On the Caribbean coast is Cartagena, with a fine harbour, and the growing ports of Barranquilla and Sabanilla at the mouth of the Magdalena. The capital is Bogotá, which lies on the eastern edge of a high fertile plateau drained to the Magdalena. This plateau is about 70 miles long and about half as wide, and contains over 2,000 square miles of fertile soil. Bogotá is finely situated at the foot of two high peaks, each of which is crowned by a cathedral. The streets rise in tiers up the slopes, and from the summit there is a fine view over Central Colombia.

319. Ecuador. Find Ecuador on the coloured map, and notice the Gulf of Guayaquil with the port of the same name. It is the outlet for the fertile valley of the Guayas river, the chief navigable river of the country. Guayaquil is the centre of the cacao plantations of Ecuador. About one-third of all the chocolate used in the world is exported from Guayaquil.

320. The interior resembles Colombia. It consists of the ranges, valleys, and plateaus of the Andes, which sink on the east to the forested Amazon basin. Ecuador was part of the empire of the Incas. Then, as now, most of the people lived on high plateaus, 8,000 feet above the sea. Agriculture is backward, except round Guayaquil, and the only manufacture of importance is Panama hats. The forest tribes of the Amazon are little more civilized than the Pygmies of the Congo forest.

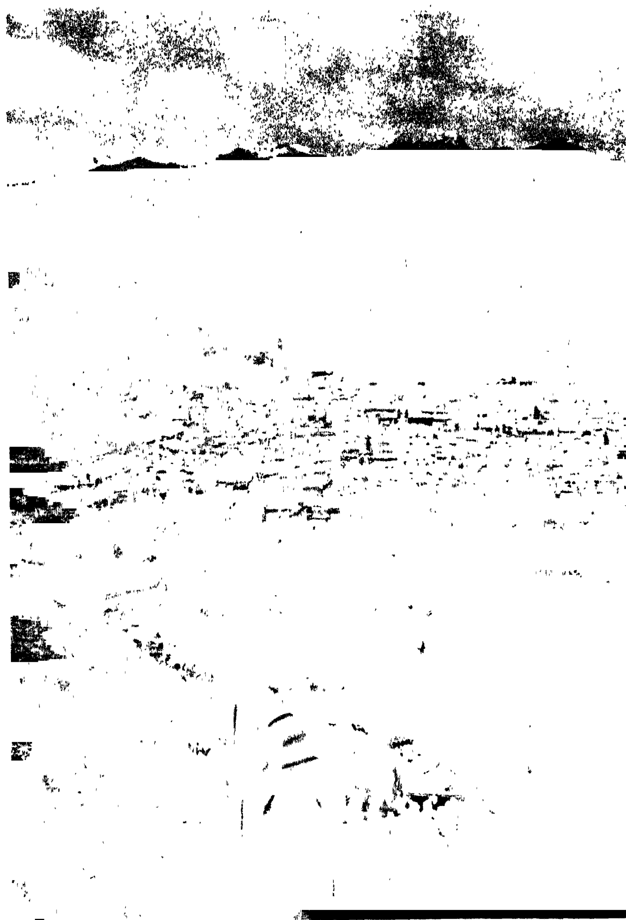
321. Quito. The capital is Quito, on the equator. It is built on a high plateau, over 9,000 feet above the sea. 'The city is picturesque in the extreme, with its white walls, red-tiled roofs, and crowds of Indians in bright-hued ponchos and broad-brimmed hats, with llamas, oxen and other beasts of burden passing cease-

lessly through the streets.' Quito was once the northern centre of the Inca power.

322. Peru. South of the Gulf of Guayaquil the Pacific coast is a desert as far south as Valparaiso in Chile. Find these places on the coloured map and compare their latitudes with those of the Sahara and of the South African desert. In Peru the coastal desert is from 20 to 80 miles wide, and is covered with bare sand dunes. Hardly a plant is seen, except where a river issues from the Andes and supplies water for irrigation. Then the monotonous desert is broken by a ribbon of green orchards and cultivated lands. Sugar and cotton are the chief crops, but rice, maize, vines, olives, lucerne, or alfalfa (§ 376), and ramie, or China grass, which has a very strong fibre, are grown.

323. The Andes form a very different region, which is called in Peru the *sierra*. Here high mountain ranges rise to over 20,000 feet, enclosing high plateaus, called *puna*, and there are fertile valleys and wild gorges. Wherever there is natural pasture, or alfalfa can be grown in the valley, there are flocks of llamas and vicuñas, tended by Indians, clad in gay ponchos.

324. In the Eastern Andes great rivers rise near the Pacific coast and flow eastward for over 3,000 miles to the Atlantic. After their first wild downward rush they become navigable, and as population grows will become great highways of trade. In the coloured map find the Marañon, which rises on the far side of the Eastern Andes in a small lake near the mining town of Cerro de Pasco. It flows through the Eastern Andes in wild ravines, and unites with the Huallaga to form the main stream of the Amazon. The Huallaga also rises near Pasco and follows a similar course. Find also the Ucayali, which flows parallel to the Huallaga



Photograph by Underwood & Underwood

Fig. 52. Quito.

Quito lies among the high Andes of Ecuador, almost on the equator. Notice the snow-clad peaks, the ravine of the river, and the poncho or blanket worn by the man in the foreground.

and Marañon. Notice carefully the direction of these three rivers, for it shows how the ranges of the Eastern Andes run. The tributaries which rise on the eastern slopes of the Andes follow a different direction, as the map shows.

325. Mining is very important in the sierra region. Many silver mines are worked at a level higher than that of Mont Blanc. The famous silver and copper mines of Pasco are connected with Lima by the line through Oroya. This line will be extended to Cuzco (Fig. 49), the southern capital of the Incas. Puño, on Lake Titicaca, is a mining centre, and the starting-place for steamers on Lake Titicaca. These connect with the line to La Paz.

326. The third region of Peru is the montaña or forest region of the Eastern Andes and Amazon basin. Iquitos, a river port on the Amazon, is the centre of the Peru rubber trade. Agriculture is beginning in the higher valleys of the montana region, where sugar, coffee, cacao, cocoa, tobacco, and many fruits succeed.

327. Lima, the capital, a few miles from the coast, was built by Pizarro, the Spanish conqueror of Peru. Its port is Callao. The country round Lima is irrigated by the waters of the river Rimac. The city is built of adobe, or sun-dried mud bricks, covered with plaster. The streets are straight and cross at right angles, as in most South American cities. Many open to squares, with statues, trees, and fountains. The finest contains the cathedral, the most imposing building in Lima. Arequipa, finely built of stone, with many churches, is separated from the coast by a desert 60 miles broad. It is finely placed in a fertile plain at the foot of El Misti (§ 311).

328. Bolivia. Bolivia resembles Peru, but lost its coastal possessions in the wars of 1883. Owing to its

height and mineral wealth it has been called the Mexico of South America. Much of it consists of a high plateau, 12,000 feet high. The highest peaks, Illimani and Sorata, are nearly 22,000 feet high. The rich silver mines of Potosi became proverbial, but Bolivia also produces tin, copper, and other minerals.

329. The chief occupations of Bolivia are mining, the keeping of animals on the puña, and the forest industries in the montaña, which is drained to the Amazon. Agriculture only just supplies the wants of a scanty population. The puña is the home of the potato, which forms almost the only food of the Indians living round Lake Titicaca. The native boats on Lake Titicaca are made of plaited straw, with plaited grass sails, because of the scarcity of wood.

330. Steamers on Lake Titicaca, which lies 12,500 feet above the sea, connect the capital, La Paz, with the lines from Peru. There is also a line to Lake Titicaca from the Chilean port of Antofagasta. "La Paz lies along the inner sides of a rocky amphitheatre, a panorama of red roofs and blue and white buildings, with many churches, and groups of willow and eucalyptus."

331. Chile. Find Chile on the coloured map and note the latitudes within which it lies. They correspond to the latitudes of the Canary Islands and Edinburgh respectively. Punta Arenas, the port of Magellan Strait, is 1,600 miles south of Cape Town. Chile therefore has a much greater range of climate than any South African country. It is nearly 2,000 miles long, and less than 100 miles broad, except in the north and south where it broadens out to 250 miles.

332. Notice the broken coastline south of lat. 40° S. Southern Chile was covered with an ice sheet in the distant Ice Age (vol. v, ch. i). Huge glaciers then

reached the sea and carved out very deep valleys. When the climate became warmer they melted, and the sea filled their deserted valleys. These drowned valleys now form fiords like those of Norway. Notice the islands of Chiloe and other islands off the coast. Probably the land has sunk, and these islands are part of a submerged coastal range. Find the island of Tierra del Fuego, which is cut off from the mainland by Magellan Strait; and Cape Horn, the most southerly point of South America, on an island to the south. Compare Southern Chile with Northern Norway.

333. With such a range of latitude Chile would have many different climates even if it were flat. Remember, however, that it contains the highest peak of the Andes, Aconcagua. It consists of a coastal plain, with a coastal range, which is submerged in the south; of a central valley between this and the main chain of the Andes; and of the high Andes. The mountains are rich in gold, silver, copper, and other metals. Chile supplies most of the copper smelted on the South Wales coalfield.

334. Climate of Chile. The northern part of Chile is in the rainless trade-wind belt, and forms the desert of Atacama. South of lat. 35 S. the prevailing winds blow from the south-west and bring rain. The rainfall of Southern Chile is very heavy and the forests are very dense. The cold Humboldt current makes the climate cold for the latitude, and the Chilean coast is cooler than the Atlantic coast in the same latitudes (§§ 195, 279).

335. The Desert of Atacama. We have seen that in a dry climate the fertilizing elements are not washed out of the soil as they are in wet countries (§ 108). The Atacama desert is so dry that the bodies of the animals which die on the trail become dried or mummified. In

many parts of the Atacama desert there are vast deposits of nitrates, or Chile saltpetre, a valuable artificial manure. It is strange that this desert, where hardly a blade of green is seen, supplies abundantly what is needed to give back fertility to the worn-out soils of other lands. The richest nitrate fields are some distance from the sea, beyond the coastal range, and 3,000 feet or more above sea-level. Food and water have to be carried by rail. We may compare this with the difficulties of provisioning the goldfields in the desert of Western Australia (§ 262). The nitrate ports are Iquique (supplied with water by canal from the Andes), Antofagasta, and Coquimbo. The latter is the centre of a copper region.

336. The Central Valley of Chile. The long narrow central valley of Chile is about 30 miles wide. The rivers from the mountains which enclose it have covered it with deep alluvial soil, and supply water for irrigating it. All Mediterranean plants do well. We may compare it with the Tell region of Algiers (§ 91), or the Californian Valley (Vol. V). Wheat and barley are grown for export. The largest town is Santiago, the capital of Chile, at the foot of spurs of the Andes, a fine city with beautifully laid out suburbs. The port is Valparaiso ("The Vale of Paradise"), a name to compare with Cape Verde in Africa, where the desert coast also ends. It is the terminus of the transcontinental line (§ 310).

337. Southern Chile is a land of forests with cattle ranches in the clearings. Timber is wanted all over the world, and as the forests of one land are destroyed those of others increase in value. Chile has a great source of wealth in these magnificent forests. In the cold, wet, bleak south, sheep-breeding is carried on, and whalers and sealers sail to the southern seas. Punta Arenas exports wool, hides, tallow, ostrich feathers, fox skins,

and rugs of guanaco and vicuña wool. It will become a coaling station, obtaining coal from Chile, Britain, and Australia.

338. People and Civilization. Chile, with much more land in temperate latitudes, is more advanced than the other Andean countries. The educated classes are of almost pure Spanish blood, but the lower classes are more Indian than Spanish. Chile has encouraged emigrants in recent years. Those from Southern Europe find a suitable climate and occupations in the central valley or in the mining districts. German settlers in Southern Chile are clearing forests, keeping stock, and introducing tanning and other industries.

Exercises

1. Write a short account of the advantages and disadvantages of Colombia. Why is it a backward country?
2. Compare Ecuador and Colombia.
3. Draw a map of Peru, marking the chief rivers and towns.
4. Describe the different regions and climates of Chile.
5. Write a short account of the desert of Atacama, and compare it with any region like it.
6. What are the chief occupations of Chile, and where is each carried on? Why?
7. Draw a map of Chile and Bolivia, marking the chief towns and railways.

CHAPTER XXIX

VENEZUELA AND THE GUIANA HIGHLANDS

339. The South American Lowlands. The coloured map of South America shows that there is a marked difference between the Andean countries and the rest of South America. The Andean countries have narrow coastal plains and high mountain-girt plateaus, but all the other South American countries have vast lowlands watered by great rivers.

340. The northern mainland of South America was discovered by Columbus. While still far from the coast he noticed, as travellers still do to-day, that the milky waters of a great river, loaded with sediment, were pouring into the blue salt water. This showed him that at last he was near a continent, for the river was too great to flow from any island. It was, in fact, the outward wash of the great Orinoco, which like all tropical rivers carries an immense volume of water to the sea, and is heavily loaded with sediment, especially in the rainy season. Find the Orinoco on the coloured map, and notice that it enters the sea by a great delta, opposite the West Indian Island of Trinidad.

341. The coloured map shows the Central Lowlands of South America. This consists of (i) the Orinoco Lowland, with the lowlands of the Essequibo in British Guiana, separated by the Guiana Highlands from (ii) the Amazon Lowland. The western edge of this forms the montaña of the Andean countries, but most of it is in Brazil. The Brazilian Highlands separate the Amazon Lowlands from (iii) the lowlands of the Plate River, which form Paraguay, Uruguay, and Argentina.

342. The Guiana Highlands. Find these on the map. Notice that they are in the hot wet belt and must receive a very heavy rainfall. They are densely forested, and the many rivers which rise there fall too swiftly to be used as routes. The Guiana Highlands rise to 11,000 feet in the highest part, and to 8,000 feet in the great table mountain of Roraima. They are known to be rich in gold, but the country is so difficult to penetrate that it is still largely unexplored.

343. The Orinoco. The Orinoco rises in the south-west part of the Guiana Highlands. After falling rapidly, but still at no great distance from its source, it divides, at a height of about 1,000 feet above the sea, into two branches. One of these, the Cassiquiare, flows south into the Rio Negro, a tributary of the Amazon, which it enters after a course of 250 miles. The other forms the main stream of the Orinoco, and flows in the opposite direction round the western and northern base of the Guiana Highlands to the sea. The distance in a straight line between its source and mouth is about 500 miles, but its winding course gives it a length of over 15,000 miles.

344. The Orinoco flows through three very unlike regions: (i) the hot wet forests of its upper course; (ii) the grassy llaños of its middle and lower course; and (iii) the mangrove swamps of the coastal belt. During its descent to the sea it forms two series of step-like rapids, which are about 35 miles apart. It is navigable for about 500 miles above the first set of falls, and for nearly 900 miles below the second. It carries most water between April and October, and is highest in July and August, when it floods the low-lying lands. It receives short swift tributaries from the Guiana Highlands, and long slow navigable rivers from the more

distant Andes. Find on the map the Guaviare and the Meta, the most important of the latter. The port of the Orinoco is Ciudad Bolivar, over 200 miles from the sea, where the river narrows at the head of tidal navigation.

345. The Climate of the Orinoco. Notice in the map that the Orinoco lowland widens from the sea inland. The rainfall is much less in the lowlands than in the highlands. The lowlands have a well-marked dry season, and are savanas, with patches of dense forest in the valleys of the rivers which cross them. They support millions of horses and cattle, but in the dry season, when the grass withers and the streams are low, these suffer greatly from both hunger and thirst.

346. Venezuela. Venezuela, in spite of its natural advantages of climate, soil, and situation, is one of the backward countries of South America. It consists of (i) the Andean region, in the west; (ii) the llanos or savanas of the Orinoco; and (iii) the Guiana Highlands. The Andean region continues the Andes of Colombia. It has dense forests up to a height of about 10,000 feet, with grasslands above bleak paramos. Still higher the valleys are slowly being cleared, and coffee, sugar, cacao, maize and other tropical plants are grown in the *tierra caliente* up to a height of about 5,000 feet. Beans, potatoes, and barley can be grown to 8,000 feet in the *tierra templada* and *tierra fria.*

347. The llaños of Venezuela stretch away to the horizon apparently as level plains, but in reality they rise to the highlands and mountains which shut them in. They are dotted with belts of forest, in which palms are common. There is hardly any agriculture, but stock-keeping is very important.

348. The Coast Lands. The rivers which descend to the sea have built up lowlands along parts of the

coast. The lake or lagoon of Maracaibo is being slowly filled up by river sediment. East of this the Caribbean coast is mountainous, with fair harbours. Caracas and Valencia are in the centre of a coffee and cacao region. The cacao and chocolate of Venezuela are equal in quality to that produced in Ecuador. The capital, Caracas, is about 6 miles inland as the crow flies, but the railway which connects it with La Guayra, its port, is over 20 miles long, and climbs a pass 5,000 to 6,000 feet high. A wide view is seen from the highest point of the line, which is described by Lady Brassey in the *Voyage of the Sunbeam*: 'On either side La Guayra and Caracas were visible far below in the two valleys at our feet. It was an extraordinary view, embracing many hundreds of square miles, and stretching far away into Venezuela. Surrounded by plantations of sugar cane, which made an oasis in the plain, Caracas looked the very type of a South American town, laid out in square blocks, with streets all running at right angles, of low, white, one-storied, stone-walled, red-roofed houses, exactly the colour of the surrounding earth and mountains. An occasional church or public building rose above the otherwise flat surface of the capital of Venezuela.'

349. The Guianas. British, Dutch, and French Guiana are the only European possessions in South America, with the exception of the Falkland Islands (§ 375). Find them in the map. British Guiana, which is as large as the United Kingdom, lies east of the delta of the Orinoco. Notice that British Guiana lies between lat. 9° N. and lat. 1° S. The north has a well-marked dry season, which does not suit forest trees, and is a savana land. The coast is fringed with mangrove swamps. British Guiana consists of (i) the low alluvial

plain, about 20 miles broad, built up by the Essequibo and other rivers; (ii) the llanos; and (iii) the forested south.

350. Most of the people live in the low coastal belt. The Dutch, who first colonized it, reclaimed this low-lying river-built land, as they reclaimed Holland, by building dykes, cutting canals, and pumping out the water. British Guiana is really a tropical Holland. Sugar is grown and made into rum and molasses. Much was formerly exported as brown Demerara sugar. As population grows, and the land is cleared and opened up with roads and railways, British Guiana will become more valuable than it is now, but it will never be a very healthy country for white men except in the higher parts. The capital is Georgetown, a garden city, set among palms and sugar plantations, on the right bank of the Demerara river. Dutch Guiana (capital Paramaribo), and French Guiana (capital Cayenne), are very similar.

Exercises

1. Draw a map of the Orinoco, Venezuela, and the Guianas, marking Ciudad Bolivar, Georgetown, and Cayenne.
2. Write a short description of the different natural regions of Venezuela, noting the plants and occupations.
3. Write a short account of British Guiana, and show its value to the empire.
4. How does Dutch Guiana resemble Holland?
5. Explain why most of the Orinoco basin is a savana and not a forest land.

CHAPTER XXX

BRAZIL

351. Brazil. Find Brazil on the coloured map. It consists of over twenty States and contains about half of South America. It is larger than Australia and nearly as large as Europe. About two-thirds of Brazil consists of the Amazon Lowlands and about a quarter of the Brazilian Highlands.

352. Brazilian Highlands and Lowlands. The Brazilian Highlands form a plateau from 2,000 to 3,000 feet high, crossed by ranges which rise to 11,000 feet near the sea. The broadest part of the plateau forms the almost uninhabited State of Matto Grosso, which extends to the Bolivian frontier, and the better-peopled States of Goyaz and Minas Geraes. The last is the most thickly peopled part of Brazil, chiefly because it is rich in minerals. The longest river is the San Francisco, which flows north to a large coastal lowland. Tributaries also flow to the Amazon and Plate rivers. The lowlands are the densely forested Amazon lowlands, and the Plate lowlands, which are savanas.

353. Climate of Brazil. Brazil lies between lat. 5° N. and lat. 33° S. Most of it is between the tropics, and the broadest and lowest part is in the equatorial belt. We know from this that the climate will be hot all the year round, except on the highlands, where the increased height will reduce the temperature. In the highest parts frosts are not uncommon.

354. The Amazon Lowlands lie in the belt of equatorial rains and are one of the wettest regions in the world. The largest tributaries of the Amazon come from the south, and carry most water between December and June,

in the southern summer. The Rio Negro and the other northern tributaries are fed by the rains and melting snows in the summer months of the northern hemisphere. During their flood season the Amazon tributaries are swollen into great lakes and much of the forest is under water. A traveller speaks of palms 200 feet high rooting under floods 60 feet deep.

355. The rest of Brazil is in the trade-wind belt and the amount of rain depends on the lie of the higher ground. The slopes exposed to the trade winds receive heavy rains and are forested. The drier regions in the lee of these higher wetter parts are savanas. The savanas of Brazil are called *campos*, and differ little from the llanos of the Orinoco or the savanas of Central Africa.

356. The Amazon. Find the Amazon on the coloured map, and if possible compare this with the Oxford Wall Map of South America. The main stream of the Amazon rises less than 100 miles from the Pacific coast, and has a course of over 3,000 miles across the broadest part of the continent. At least thirty of its tributaries would rank as great rivers, and each is a great river, itself receiving many tributaries. If we reckon the navigable waters of the Amazon and its tributaries at 10,000 miles, it is probably less than the truth. For the last 250 miles it is never less than 50 miles across, and at its mouth, where a great sandbank or island divides it into two channels, it is 250 miles from bank to bank. The immense volume of fresh water which it discharges can be traced far out to sea (§ 340).

357. Look out the most important tributaries on the map. Those from Colombia and Ecuador flow east. Find the Rio Negro, or Black River, which is connected with the Orinoco by the Cassiquiare (§ 343). The great

river port of Manaos is at its confluence. The headstreams of the Amazon (§ 324), the Marañon, the Huallaga, and the Ucayali, flow north in parallel valleys between the ranges of the Eastern Andes before they turn east to the Atlantic. Find also the Madeira, which flows to the Amazon from the south. Its tributaries stretch out like the fingers of a great hand and drain a vast area of the eastern ranges. Below its confluence the Amazon receives many long tributaries from the Brazilian Highlands. Many of these rise near tributaries of the Plate River, and the two rivers are connected during the rainy season. Find the Tocantins River, which flows to the Amazon estuary. The southern channel of the Amazon estuary is called the Para River, and on it is the rubber and vanilla port of Para, or Belem.

358. All these rivers have their falls and their navigable reaches, their rainy seasons and their times of flood, which are not those of the main stream. This reminds us of the tributaries of the Nile (§ 128).

359. The Amazon Forests. The Amazon forests have already been described. Two kinds of life go on in them. The forest Indians are wandering fishermen. Fish, turtle, and turtle eggs are their chief food, and they do not use nets, but shoot fish with bows and arrows. They build huts of bark where they make a halt. Sometimes they leave the women there long enough for them to sow and reap a little manioc. Thus agriculture begins.

360. The white or half-breed traders and settlers are chiefly engaged in the rubber trade. Some collect the supplies obtained by the forest Indians, and others live in the river ports and send rubber and other goods up and down stream. There is little agriculture as yet in the Amazon basin except round these river towns.

Most of the rubber finally reaches Para, which is built on alluvial soil, on the edge of the forest.

361. Occupations of the Brazilian Highlands. There is a great contrast between the Amazon basin, with a slope of less than an inch to the mile in Brazil, and the Brazilian Highlands. These vary greatly in height, soil, rainfall, and plants. The chief occupations are agriculture, cattle-keeping in the campos, and mining. Brazilian diamonds, though valuable, are less fine than those of South Africa.

362. The cultivated plants of Brazil are many, but coffee is the most important. All the products of the *tierra caliente* and the *tierra templada* can be grown at suitable heights. Railways have been built to connect the coffee plantations with the ports.

363. The Plate Basin. Most of Southern Brazil lies in the Plate basin, which is a savana, except in the wetter parts. Cattle-breeding is very important, and much coffee is grown round São Paolo. This region may be compared to Nyasaland.

364. A Coffee Plantation. In Southern Brazil coffee is planted on hill slopes which have been cleared of forest, for forests show that there is a sufficient rainfall. The plants are set in rows, with some food-crop, such as maize or manioc, between. Coffee requires heat, moisture, good drainage, and careful weeding. The trees bear in their third or fourth year and soon become very productive. Coffee is a strong-growing plant, and exhausts the rather scanty soil of the hill-sides in about twenty-five years. The plant is in bloom for about eight months, and is covered with fruit at various stages. In Brazil three crops are gathered in a year, and the quality depends partly on careful cultivation, and partly on the way in which it is prepared for market.

365. The coffee berries are gathered in November, and at this busy season even children help. Each berry contains two beans, surrounded by pulp, which is removed by machinery. The beans are then dried, and their inner and outer shells are removed, and they are packed in bags and sent to the ports.

366. 'A coffee plantation', writes a traveller, 'is a little world in itself. There are smithies and workshops, machines for preparing manioc, a saw-mill, a corn-mill, a sugar-cane mill, and a still where the juice of the cane is made into rum. There is also a brick-kiln and a pottery.'

367. Population and Towns. Only the eastern part of Brazil is yet developed, and more population is needed. The educated Brazilians are of Spanish descent, but the lower classes have much Indian and negro blood. Many Italians have settled in the warmer parts of the eastern provinces, and there are prosperous German colonies in the more temperate lands of Southern Brazil. Compare this with Chile (§ 338).

368. The Amazon river-ports have already been mentioned. There are no large inland towns. Find on the map Pernambuco, exporting sugar and cotton, and Bahia the second harbour of Brazil. Bahia is in a very fertile region, where sugar, tobacco, and other tropical crops are grown. Find Rio de Janeiro, commonly called Rio, the capital of Brazil and the largest city in the southern hemisphere, with nearly a million people. It is beautifully situated on a fine bay, framed by the Organ Mountains, which reach 7,000 feet. The botanic gardens are the most famous in the world, and the city contains many fine buildings of the Spanish-American type. Rio has an immense trade with all parts of the world. Farther south is Santos, the chief coffee port.



Fig. 53. THE HARBOUR OF RIO JANEIRO.



Fig. 54. MONTE VIDEO AND THE PLATE ESTUARY.



From Photographs lent by the R.M.S.P.C.

Fig. 55. PLAZA IN BAHIA BLANCA.

Exercises

1. Draw a map of Brazil, shading the land over 3,000 feet and marking the chief towns and rivers.
2. With what parts of Africa and Australia, if any, would you compare Brazil ?
3. Draw a map of the Amazon and its tributaries, marking the names of the latter.
4. What are the chief cultivated plants of Brazil ? Where is each important, and why ?
5. Explain why Brazil is thinly peopled. What are its chief natural disadvantages ?

CHAPTER XXXI

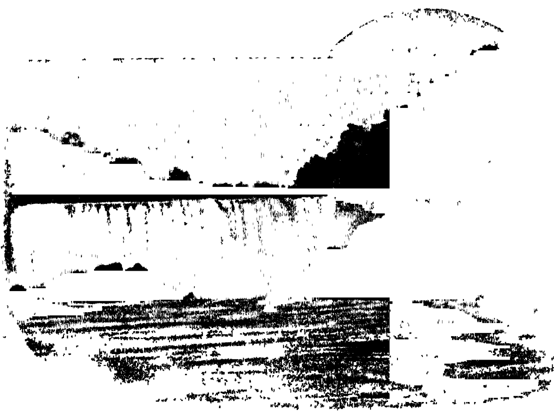
THE PLATE COUNTRIES

369. Find on the coloured map the Republics of Paraguay, Uruguay, and Argentina, all drained to the Plate estuary. The map shows that the Brazilian Highlands extend into Uruguay. Argentina is mostly lowland, but rises in the west to the Eastern Andes, which form part of the boundary with Chile, and on the south to the dry infertile table-land of Patagonia.

370. Trace on the map the rivers which flow to the Plate estuary. The Paraguay flows almost due south from the central part of the Brazilian Highlands, and unites with the Pilcomayo, a long river from the Andes. The united river receives the Parana from the eastern highlands of Brazil, and long tributaries from the Andes. Find the Uruguay, which separates Argentina from Uruguay, and flows to the Plate estuary.



Fig. 56. View of Aconcagua.
Aconcagua is the highest mountain on the continent. It is on the frontier between Chile and Argentina.



From Photographs lent by the R.M.S P.C.

Fig. 57. The Ignassu Falls.
These are on a tributary of the Panama River on the frontier between Brazil and Argentina.

371. Climate and Plants. The map shows that only the northern part of the Plate basin has a tropical climate. This is forested and little known or settled. Its forests produce much valuable timber, including the quebracho or 'break-ake' tree. It is an evergreen tree, growing to the height of 50 feet or more. Its timber is very hard, as we should expect from the name, and has been largely used for sleepers on the Argentine railways. It also yields extracts which are much used in medicine.

372. Argentina, like Chile, has many climates, varying from that of Northern Africa to that of Scotland. In the Andes the temperature depends on height as well as on latitude.

373. Argentina has a rather dry climate, especially in the belt of westerly winds (§ 288). Its lowlands form treeless pampas. In the last few years poplars, willows, and the Australian eucalyptus have been planted to supply timber and shade for stock. The pampas, sometimes called the Camp (from the Spanish word *campo*, a plain) have a quiet beauty of their own. 'There are herds of cattle, flocks of sheep, the yellow of the corn, and the vivid blue of the linseed flower. Intermixed with these is the green and russet of the maize, the purple of the alfalfa flower, and the natural verdure of the Camp.' Each of these contributes something toward the growing prosperity of Argentina.

374. Stock-raising on the Pampas. All the domesticated animals of Europe do well in Argentina. Cattle and horses number many millions. They are tended by mounted shepherds of Indian blood, who are called gauchos. These men hate the settled life of the towns, and are only at home in the saddle on the wide pampas. We may compare them with the Boers of South Africa and the cowboys of the North American

prairies. Before railways were made they wore gaily coloured ponchos and a special dress, but as civilization spreads these picturesque old-world fashions disappear. Horses are in demand for our own and other European armies. The dairy industries are growing and butter is exported (§ 248). Millions of cattle are slaughtered every year in the Atlantic ports of the Pampas. Some of their flesh is chilled for export, and some is sun-dried or 'jerked', for use in South America. The hides and tallow are of great value.

375. Sheep are important all through the pampas, but especially in Patagonia. They are also kept in the Falkland Islands (British), which lie east of Patagonia. Wool is an important and growing export, as it is from Australia and New Zealand in the same latitudes (§§ 209, 248, 257). Ostrich-farming is also becoming important. The South American ostrich does not produce such valuable feathers as the South African ostrich, which has been introduced into Argentina (§ 209).

376. The Cultivated Pampas. Four plants are named in § 373 as giving colour to the landscape. The first is wheat; this is a grass, and it can be grown in most of the grasslands of the world. Argentina grows more wheat every year. Its vast level wheatfields are ploughed, sown, and reaped by machinery, as the North American wheatfields are. Maize is also a profitable crop, but it suffers greatly from the ravages of locusts. Alfalfa was introduced into Argentina about twenty years ago and is now largely grown for fodder. It is a plant well suited to a dry climate, for it has very long roots which go down to great depths in search of water. Alfalfa grows to the height of three feet or more and yields three or four crops a year. Before one crop is cut and dried the green shoots of the next are already sprouting.

377. The Argentine Locust. All the drier parts of the southern continents suffer from locusts, and Argentina does so too. 'The force of their numbers is extraordinary', writes a traveller. 'They will settle on the boughs of large trees, layer on layer, till the limbs bend and crack beneath their weight. One may see the fronts of railway engines, carriages, and trucks, which have passed through a swarm of locusts, thickly coated with their bodies. It would be easier to stay a cloud in the sky than to interfere with a flight of locusts. Even the wingless youngsters possess unswerving determination, and will go the length of forcing their way across rivers. Plunging their little bodies in the water, they battle across, emerging on the other side a mile or so down stream, with a trifling loss of a few thousands or millions of their number.' Locusts commonly appear just before the maize harvest is ready. Linseed has then been gathered and the wheat ear is already hard, but maize still has large juicy leaves and soft green ears. In a few hours a swarm of locusts will eat a whole plantation of maize bare, leaving only the bare stalks to show that life was once there. Locusts are greedily eaten by ostriches and poultry, but when hens eat them their eggs are unfit for human food for some time.

378. The Far West. Find Mendoza on the coloured map. It lies at the base of the Andes, on the transcontinental line between Buenos Aires and Valparaiso, in Chile (§ 310). Mendoza is a vine-growing centre. The vine, like the date palm, likes water at its roots and warm sunny air round its fruit. The Mendoza district is irrigated by streams from the Andes and numberless canals intersect the vineyards. The vines are often grown up tree trunks and over lattice work connecting them. Under these conditions every kind

of grape comes to perfection. Much wine is made, and during the vintage season special grape-trains are run to all parts of the country. Fruits of all kinds are grown, and the peach is as common as the apple in this country. Millions of acres are planted with poplars, which fetch a high price in the treeless pampas.

379. Railways and Towns of Argentina. Railways can easily be built across the level pampas, and the most productive districts are connected with the larger towns by a network of lines. The chief centre is Buenos Aires, the capital and port of Argentina. It is built on flat ground, and has miles of docks on the muddy Plate river. The city contains a million people and does an enormous trade in meat, cattle, wheat, and wool. Bahia Blanca, in Southern Argentina, the naval station and arsenal, is growing into a great port which will be the outlet for the rich lands of Southern Argentina. The river port of Rosario is the second city of Argentina and can be reached by ocean-going steamers. Next follow in order of size Cordoba, the largest city of Central Argentina ; Tucuman, in the north, in a district which grows sugar, maize, and tobacco ; La Plata, a port on the estuary below Buenos Aires ; and Mendoza.

380. Uruguay. Uruguay is an undulating country with grassy plains and more woods and trees than Argentina. The cattle are larger than those of Argentina and produce finer hides. The sheep are smaller and yield poorer wool. The chief industries of Uruguay are the slaughtering of cattle, the 'jerking' of beef, much of which is sent to Brazil, the canning of tongues and corned beef for the European market, the making of meat extracts, and the working up of the refuse into many useful products. Nothing is wasted, and even the bones and blood are turned into fertilizers. Fray Bentos

is the centre of the meat-extract industry, and Paysandu is noted for ox-tongues and corned beef. Monte Video, on the Plate estuary, is the capital and the chief port.

381. Paraguay. Paraguay is a land of forests crossed by great rivers. It produces valuable timber, rubber, dye-woods, drugs, and other tropical plants. Sugar, maize, and tobacco are cultivated. Maté, or Paraguay tea, is drunk all over South America, and is said to cure fatigue at once. The capital is Asuncion, on the Paraguay.

382. Conclusion. We have now seen how the southern continents resemble each other and how they differ. South America is the richest of them all. At first it was valued only for its precious metals, but now we know that these are the least part of its wealth. The plants which its tropical forests produce are in demand all over the world. They will increase in value as men learn how to stamp out tropical diseases. Its temperate lands will long help to feed the world. In this, South America resembles Australia and New Zealand, but it has much more land in temperate latitudes. Wool, wheat, and meat are what these lands add to the world's store of wealth.

383. One more point should be noticed. The southern continents learn from each other and from the Old World lands in the same latitudes. The domestic animals of the Old World have been introduced into the grasslands of the New World. The camel is used in the African and Australian desert as it is in the Arabian desert. The South African ostrich has found a home in South America. The same is true of plants. The vine has spread from the Mediterranean to the shores of South Africa and Australia and to the base of the Andes. Wheat has been planted in all the grasslands, and maize

has been brought from South America into the warm temperate lands of the Old World. The potato has spread from the high Andean plateaus to every part of the world, and coffee has been transplanted from the Abyssinian highlands to the *tierra caliente* of South America. Tobacco, a South American weed, has become a world-wide luxury. These are but a few examples of the way in which the whole world is bound together. Let us not forget this when we look at the lines of latitude on our globes and maps.

Exercises

1. Draw a map of the Plate countries, shading the land over 3,000 feet and marking the chief rivers and towns.

2. Divide the Plate countries into natural regions, and compare them with similar regions in any part of the World.

3. What are the chief industries of the pampas? With what region of (*a*) North America, (*b*) Asia, (*c*) Africa, (*d*) Australia would you compare them? Is the reason for the comparison the same in all cases?

4. Describe the various industries which grow out of cattle-breeding in the Plate countries.

5. Where is the locust a pest outside Argentina?

6. Describe the irrigated area at the base of the Andes. What special advantages does it possess?

7. Draw a map of the transcontinental line which crosses South America.

8. How will South America be affected by the opening of the Panama canal?

9. What are the chief undeveloped resources of South America?

10. How do you explain the relatively small population of South America? How could it be increased?

11. Make any comparisons you think useful between South America and Africa.

12. Make any comparisons you think useful between South America and Australia.

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